SANTA CLARA VALLEY
WATER DISTRICT

AMENDED

PLANNING STUDY

FOR

STEVENS CREEK

(CENTRAL AVE., MOUNTAIN VIEW TO STEVENS CREEK DAM)

NORTHWEST ZONE

PROJECT NUMBER 1029

August 28, 1974

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1974
REF

TC425S819 74c.5

SANTA CLARA VALLEY WATER DISTRICT

REPORT OF

PLANNING STUDY

(pursuant to section 10, SCVWD Act)

FOR

STEVENS CREEK

(CENTRAL AVE. MOUNTAIN VIEW TO STEVENS CREEK DAM)

NORTHWEST ZONE

PROJECT NUMBER 1029

August 1974

Report prepared by Design and Construction Unit Staff

Stan Wolfe, Project Engineer
Joe Pandit, Associate Civil Engineer
Nicholas Lyn, Assistant Civil Engineer

under the direction of

John L. Richardson
Head, Project Development Branch
and
George Korbay
Design and Construction Manager

John T. O'Halloran
General Manager

Lloyd C. Fowler
Chief Engineer

DISTRICT BOARD OF DIRECTORS

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Santa Clara Valley Water District

5750 ALMADEN EXPRESSWAY
SAN JOSE, CALIFORNIA 95118
TELEPHONE (408) 265-2600

July 16, 1974

The Honorable Board of Directors
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, California 95118

Gentlemen:

Transmitted herewith is the Report of Planning Study for Stevens Creek between Central Avenue, Mountain View to Stevens Creek Dam. This study reach lies in the Cities of Mountain View, Sunnyvale, Los Altos, and Cupertino with portions in unincorporated lands of Santa Clara County, all in flood control zone NW (Northwest) of the Santa Clara Valley Water District.

For the study reach as a whole, the report describes flood and erosion problems brought out by the investigation. Immediate action is proposed only for certain critical reaches within the study area. In these cases, the report finds that structural measures to abate the erosion which threatens several homes in the City of Mountain View are impractical and proposes non-structural measures instead. In the area upstream of State Highway 280, structural measures are proposed to partially alleviate flooding, along with relying on use of federally subsidized flood insurance by the local community as a means of compensating for the remaining potential loss due to flooding.

The estimated cost of the proposed action measures is $2,800,000.

Measures to control relatively minor flooding and erosion problems for the balance of the study reach will be addressed in a future planning study which will consider multi-use aspects of the creek including coordination with the Stevens Creek linear park chain and plans of cities and other agencies.

I concur in the project as proposed and recommend a public hearing be held as a prerequisite to the construction of proposed improvements and acquisition of right of way.

Respectfully,

John T O'Halloran
John T. O'Halloran
General Manager

Enclosure

ADDENDUM TO STEVENS CREEK PLANNING STUDY OF AUGUST 1974

Item 1. Culvert under Highway 280

The following information supersedes the data regarding the proposed culvert size and cost for reach 5 given on pages 12, 13, 17-19, 24, 31, and sheet 11.

It is proposed to alleviate the severe flood hazard which exists upstream of Highway 280 by constructing additional culvert capacity by tunneling under the freeway to supplement the flood-carrying capacity of the existing 22-foot culvert. Preliminary design calculations indicate that a culvert of approximately 22-foot diameter will accomplish this purpose. The final culvert configuration will be the subject of intensive engineering analysis during final design. The report of August 1974 proposed two 14-foot-diameter culverts. This was cited only as a preliminary estimate of additional capacity needed and subject to change during final design. During the public meeting on August 7, 1974, concern was expressed over the possibility of debris blocking the 14-foot culverts, and the District was requested to look into a larger-sized culvert to alleviate the debris problem. Additional study has now been done in conjunction with the State Department of Transportation, the Southern Pacific Railroad, local contractors, and others, and it appears that one additional culvert with a diameter of approximately 22 feet will solve the backwater and debris problems. A tapered wall between the two culverts would turn any trees or other large debris coming down the creek sufficiently so they would pass lengthwise through the culvert. Any large debris or trash coming from the floodplain area would be caught on a pole-type debris retention structure, easterly of the culverts.

The cost of the one 22-foot-diameter tunnel would be approximately $1,500,000 and would be about the same as two 14-foot-diameter tunnels (the cost given in the report for the two 14-foot-diameter tunnels of $1,048,000 appears low after a more detailed analysis of the situation). A full geologic report will be required before final design and may cause further modification to our cost estimate.

Item 2. Flood Control Easements

The following supersedes all reference to maintenance easements in the report.

Maintenance easements would only be obtained when the need arises, generally when property owners request us to correct erosion problems. If an easement is needed from other property owners for access, the District would acquire these easements.

Purpose of the easement would only be to perform flood control and water conservation related maintenance. No joint use, such as trails, recreation, etc., could be made. The underlying fee owners would retain control except for conditions and limitations stated in the easement. The easement would not affect water rights and this could be stated affirmatively, along with a statement eliminating any implication of public access.

The area needed to perform such maintenance activity includes the active stream bed and creek bank area, plus five feet out from the top of each bank.

Item 3. Recording Flooding Maps

The following supersedes all references in the report to filing flood maps with the County Recorder.

In consideration of the desires of the adjacent community, the District proposes unique solutions to flooding problems on this project. Among these is a concept of alleviating but not eliminating flooding from design floods in certain reaches. Future purchasers of properties in these areas deserve notification of the floodable status of such properties. The August 1974 report proposed that the District would prepare and record "Designated Floodway Maps". It has been pointed out that the Federal Flood Insurance flooding maps, although preliminary, are available for this purpose. It has also been pointed out that the present Federal maps are not at this time in complete agreement with District estimates of flooding. For these reasons, it is proposed that the Federal maps be used for recording purposes but with suitable notation cautioning that depths are not shown and that further inquiry should be made; that these maps be changed and updated as more detailed studies are made and also as channel improvements are made; and that the District file any revised maps, voiding the prior recordation, and thus insure that correct information will appear on subsequent title reports.

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INTRODUCTION

Stevens Creek is located in the Northwest Zone of the Santa Clara Valley Water District, with the major portion of its natural watershed in the unincorporated area of the county and the balance in the Cities of Mountain View, Sunnyvale, Los Altos, and Cupertino (See Figure 1). The existing creek originates in the Santa Cruz Mountains and flows generally southeastward and then northward into Stevens Creek Reservoir. From Stevens Creek Reservoir it continues northward onto the valley floor and then outfalls into San Francisco Bay near Long Point, north of Moffett Field Naval Air Station. As it flows in a defined channel on the valley floor, it passes through highly urbanized areas of the several cities. Its watershed is bounded on the west by the Permanente Creek watershed and on the east by the Calabazas Creek watershed.

Two tributary channels outfall into Stevens Creek. Heney Creek, with a total watershed area of 0.64 square miles (410 acres) is an improved facility constructed in 1965. It outfalls into Stevens Creek just downstream of Highway 280, and its design peak flow of 240 cfs is a negligible contribution to the design peak flow of Stevens Creek (See Table I).

Permanente Creek Diversion, a man-made diversion, was constructed in 1959 to divert a portion of Permanente Creek's flood flows to Stevens Creek. The diversion outfalls into Stevens

Creek near Station 125+00 (See Sheet 7) that is between Bryant Avenue and Levin Avenue in Mountain View, and constitutes the major tributary to Stevens Creek on the valley floor.

This Planning Study investigates Stevens Creek between Central Avenue in Mountain View and Stevens Creek Dam. This reach is hereinafter referred to as the "study reach". Both flooding hazards and severe erosion problems exist for portions of the creek in this 9-mile study reach. This report describes findings as to the limits of the flood and erosion prone areas for the entire study reach (see Figure 1 for flood prone areas), however, immediate protective measures and activities are proposed for only the three most critical sub-reaches; hereinafter called "project reaches".

Flood and erosion problems for the balance of the study reach not covered by the above project reaches and for the reach downstream of Central Avenue will be the subject of a future planning study. The study will be coordinated with park and recreational projects now being planned by other agencies. The portion of Stevens Creek, downstream of Central Avenue to the Leslie Salt ponds can also be the subject of the future study because the flooding and erosion problems are not as severe as in the current study reach.

The three project reaches for which flood and erosion protection measures are proposed are (1) the reach near Pastel Lane, Franklin Avenue, and Diericx Drive to Highway 85 near Mountain View,

(2) the reach from Homestead Road upstream to the upstream end of the culvert under Highway 280, and (3) the reach from Highway 280 upstream to Stevens Creek Boulevard. Upstream of Stevens Creek Boulevard to Stevens Creek Dam is proposed to be zoned as a floodplain district by the City of Cupertino as discussed later in the report.

Alternative types of improvements have been studied to develop the most economical and environmentally favorable solution to the flood and erosion problems in the project reaches. This report presents the results of these studies and consists of:

1. A general description of the watershed and the flooding problems, together with plans delineating proposed improvements within the three noted project reaches.

2. A discussion of the proposed measures within the project reaches.

3. An estimate of the costs of the proposed measures and suggested means of financing them.

4. A discussion of alternatives to the proposed measures.

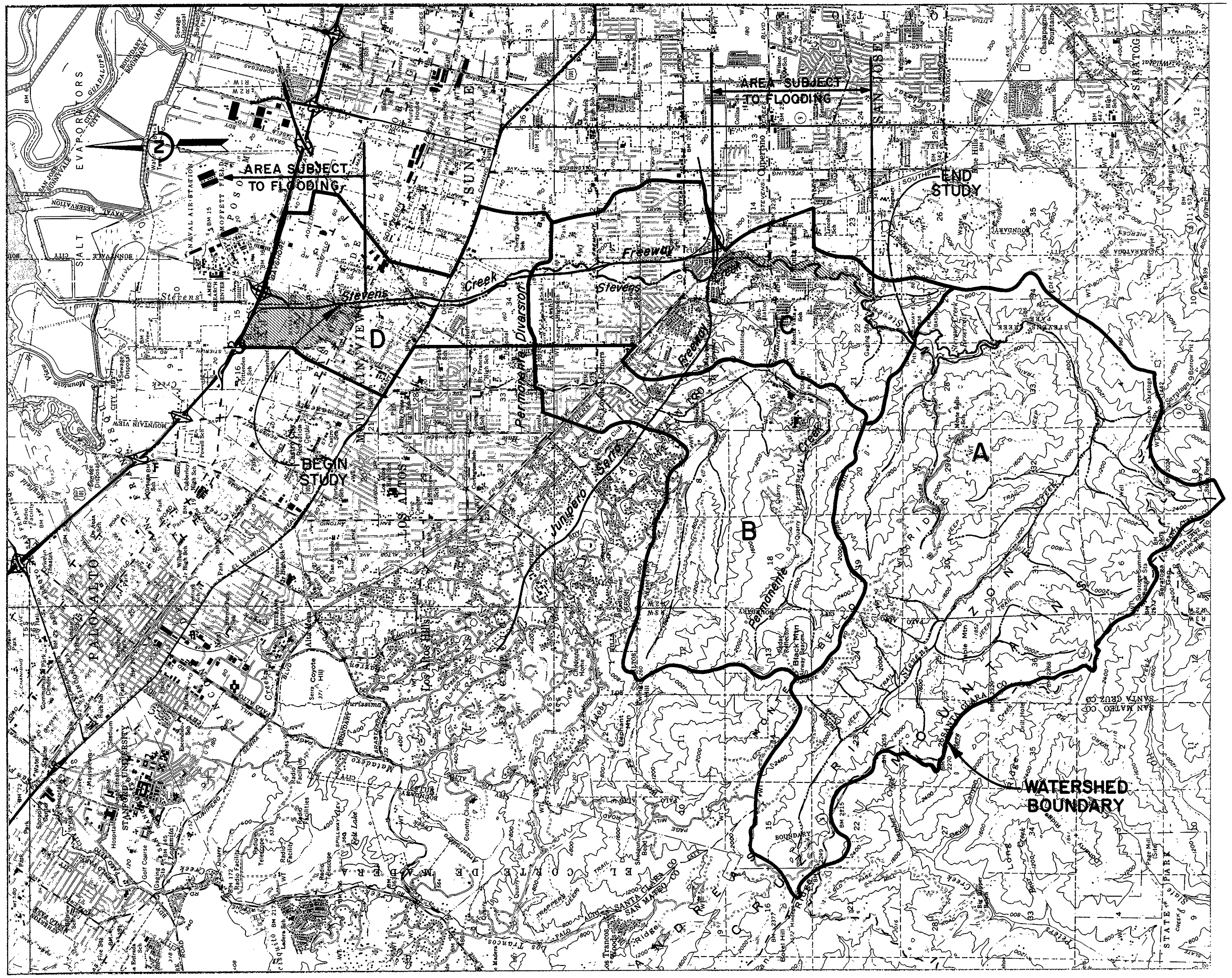


FIGURE 1

SCALE IN FEET

0 4000 8000 12000

LEGEND

—·—·— CREEK ℄

——— WATERSHED BOUNDARY

STEVENS CREEK
WATERSHED TOTAL AREA

A= 17.3 MILES^2
B= 8.88 MILES^2
C= 7.52 MILES^2
D= 4.65 MILES^2

38.35 MILES^2 TOTAL DRAINAGE AREA
@ BAYSHORE FREEWAY

**STEVENS CREEK
WATERSHED**

DESCRIPTION OF WATERSHED

Of Stevens Creek's total watershed area of 38.4 square miles, 17.3 square miles lie upstream of Stevens Creek Dam. This area is in mountainous terrain and is characteristically brushy woodlands having predominantly oak (white and live), buckeye, and bay trees.

Stevens Creek Reservoir is a water conservation facility owned and operated by the District and is located about two miles south of Monta Vista. The storage capacity of the reservoir is 3,600 acre-feet, and it has an unregulated side channel spillway with a crest elevation of 537 feet (mean sea level datum). The discharge capacity of the spillway is 11,000 cfs, with an eight-foot surcharge, i.e., zero freeboard.

The dam is a rolled earth fill type that was constructed by the former Santa Clara Valley Water Conservation District in 1935. It has the following features:

height = 120 feet
crest length = 1,000 feet
crest width = 20 feet
crest elevation = 545 feet
base width = 620 feet

The outlet structure consists of a 50-inch diameter pipe and a butterfly valve. The average yield of the reservoir is 2,600 acre-feet of water per year. The minimum water surface elevation in the reservoir is 457 feet (M.S.L.). The water that is impounded in the reservoir is used for groundwater recharge, irrigation and water-based recreation.

Downstream of the dam, the steep, hilly terrain gradually gives way to gently sloping valley floor where the watershed has been developed as a dense residential area with more commercial areas toward the downstream end.

Two of the more important characteristics of urbanization that affect flood flows are changes in the imperviousness of the basin due to roofing and paving and the existence of storm drainage facilities and channelization, i.e., improvement of the stream channels. The storm water falling on impervious parts of the basin are transferred into surface runoff with little loss, while the storm drainage facilities and the improved channel cross sections speed up the flows causing a sharp increase in the peak flows of small, more frequent floods. Larger floods, however, like the one percent design flood are little effected by urbanization. This is because the rainfall that precedes larger floods saturates the soils of an unurbanized basin in a way that renders their characteristics similar to the imperviousness caused by urbanization.

Figure 1 is a map of the Stevens Creek watershed and illustrates the general topography of the area.

The mean annual precipitation of the Stevens Creek watershed varies from 14 inches on the valley floor to 60 inches above Stevens Creek Reservoir.

The upland areas of the Stevens Creek watershed consist of folded sequences of sandstone and shale of the Vagueros Formation west of the San Andreas fault and by intensely folded, sheared, and contorted sedimentary, igneous, and metamorphic rocks of the Franciscan Complex east of the San Andreas fault. Stevens Creek Dam and Reservoir is wholly founded within the Santa Clara Formation.

As Stevens Creek emerges out of the foothills onto the valley floor, its meander has cut a broad, flat-bottomed, steep-walled, alluviated channel through old alluvial fan deposits which continue to elevation 240 near Homestead Road. Below elevation 240 to U. S. Highway 101 at elevation 2.5 the stream continues northerly over young alluvial fan deposits.

Stevens Creek is presently being utilized as a significant resource as a groundwater recharge facility. Gravelly strata of the groundwater acquifer surface along the creek bottom and provide areas to enhance recharge and combat the depletion of groundwater and attendant land subsidence, which results from groundwater overdraft.

DESIGN CRITERIA

The criteria used in the design of flood and erosion control improvements to Stevens Creek in the three project reaches described in the previous section are derived by accepted engineering practices. Economic evaluations of alternative designs were based on estimates of construction costs including engineering and inspection costs, landscaping costs, right of way values and the present worth of possible future maintenance costs.

Improvements as proposed in the Pastel Lane, Diericx Drive reach will control the severe erosion of the toe of the creek banks. Where a flood hazard exists between Highway 280 and Stevens Creek Boulevard, and structural flood control measures are not proposed due to adverse environmental impacts as well as desires of local residents, protection against loss due to flood damage is afforded through the availability of federally subsidized flood insurance.

Design flood flows were computed using the results of a regional flood frequency hydrologic analysis. This is a generalized hydrologic method developed by the District as a result of the need to estimate floods and their frequency of occurrence on gaged and ungaged basins for the design of flood control facilities and the desire to provide uniform protection District wide.

For this purpose the historic annual peak floods of 15 base stream flow stations were used. The statistical parameters (mean and standard deviation) of the records from these stations were correlated with the hydrologic and geomorphic characteristics of their respective basins. A set of equations was obtained which define the general relationship between the statistical parameters and the following basin characteristics; mean annual precipitation, basin area, a shape factor and the bifurcation ratio. The last two parameters relate to basin efficiency. Moreover, since a portion of Stevens Creek watershed is highly urbanized, special considerations were given to the design flows accounting for all the tributary flows through the system of existing storm sewers within the watershed.

Using the above-mentioned regional formulas, the peak flows for 20, 50, and 100-year return period floods were predicted, although only the 100-year results were used for design. A 100-year return period flood peak is that flood peak that has a one percent chance of being equaled or exceeded each year.

The basin, for calculation purposes, has been subdivided into three Subareas: A, C, and D (See Figure 1); Subarea B is the Permanente Creek Basin. The hydrologic features of these subareas are presented in Table I.

Hydraulic design for the project involved an investigation of the discharge carrying capacity of the existing channel to locate those reaches which are flood prone, and to establish the limits of flooding where possible.

TABLE I
SUMMARY HYDROLOGIC FEATURES & 100 YEAR RETURN PERIOD DESIGN FLOWS (c.f.s.)

Location	Sub-area	Area (Sq.Mi.)	Mean Annual Precipitation M.A.P. (In.)	1% Design Flows Design * Flows
1) Immed. Upstream of Stevens Creek Dam	A	17.3	39.2	6700
2) Immed. Downstream of Dam	A	17.3	39.2	6300
3) Immed. Upstream of Confluence with Permanente Ck. Diversion	A+C	24.82	33.9	6825
4) Immed. Downstream of Confluence with Permanente Ck.	A+B +C	33.70	33.19	8270
5) At Bayshore Freeway (U.S. 101)	A+B+ C+D	38.35	29.33	8700

*Assuming Stevens Creek Reservoir full at beginning of design flood.

Water surface profile computations utilizing design flood flows derived as described above, were done beginning at the creek's outfall into San Francisco Bay and proceeding upstream to Stevens Creek Dam. The many factors influencing depth of flow in an open channel, such as channel roughness, slope, cross-sectional shape, and design discharge were analyzed. The normally tedious calculation of the water surface profile, involving iterative mathematical techniques, were made easier by the use of the U.S. Army Corps of Engineers' computer program Water Surface Profiles. The computations yielded specific data regarding depths of flood flows in the creek as well as expected water velocities which must be accommodated to abate erosion.

DESCRIPTION OF THE STUDY FINDINGS AND PROPOSED PROJECT

The study reach for Stevens Creek extends over a distance of about 9 miles, however, this report proposes measures to abate flood and erosion problems on only 1.9 miles (10,100 feet) of the creek in the Cities of Mountain View, Los Altos and Cupertino and portions in unincorporated areas of Santa Clara County (see Sheet 1). For purposes of description, the entire planning study is divided into 7 reaches (downstream to upstream) as follows (reaches for which specific measures are proposed and adopted by this report are noted as "Project Reach"):

Reach 1	Sta 0+00 to Sta 22+00	
Reach 2	Sta 22+00 to Sta 77+25	
Reach 3	Sta 77+25 to Sta 105+70	Project Reach
Reach 4	Sta 105+70 to Sta 243+00	
Reach 5	Sta 243+00 to Sta 266+60	Project Reach
Reach 6	Sta 266+60 to Sta 315+60	Project Reach
Reach 7	Sta 315+60 to Sta 474+00	

Alternatives to those measures proposed to abate flood and erosion problems in the project reaches are discussed later in this report. Separate detailed construction plans would be prepared for all structural measures proposed in this report subsequent to the report's approval. These include a new culvert at Highway 280 and a new bridge to replace the existing structure at McClellan Road in Cupertino.

The report proposes three basic methods of dealing with the flood and erosion problems on Stevens Creek in the project reaches.

1. In Reach 3 where the existing channel capacity is adequate and a severe erosion and bank stability problem exists, annual channel maintenance is proposed together with the establishment of future District right of way lines. The future District right of way line is established by projecting a theoretical two horizontal to one vertical (2:1) slope from the existing toe of bank to a point where it meets existing surrounding ground and adding 23 feet horizontally for a maintenance road. In this residential area subject to bank failure, the District would propose to purchase any home sufficiently threatened by eroding creek banks upon request of the owner. Two critically threatened homes are being recommended for immediate purchase while 23 others are designated to be purchased upon request of the owners, or when the bank stability problem becomes sufficiently critical to endanger the homes.

2. In Reach 5, a new culvert~~s~~ ~~are~~ is proposed under Highway 280 to alleviate flooding upstream.

3. The flooding problem in Reach 6 upstream of Highway 280 would be reduced but not eliminated by the work proposed in Reach 5. Since structural measures are not desired by the local community, federally subsidized flood insurance is suggested. As in

Reach 3, several homes are designated for purchase by the District and would be purchased upon notice of intent to sell by the owners.

Description of Study Findings by Reach

Reach 1 (Sheet 1)

Reach 1 of the study reach extends for approximately 0.42 miles (2,200 feet) upstream of Central Avenue in Mountain View, to about 900 feet upstream of West Evelyn Avenue. In its present state, the creek does not have adequate flood carrying capacity in this reach due to inadequate cross-sectional area. A future planning study will propose measures to provide flood protection in this reach and will be coordinated with other multi-purpose uses including the park chain plans of the City of Mountain View and the Mid-Peninsula Regional Park District.

Any structures lying within the delineated flood area to be mapped by the U. S. Department of Housing and Urban Development may be eligible for federally subsidized flood insurance. Reference is made to the Appendix for details of the Act.

Reach 2 (Sheets 3 through 5)

Reach 2 extends for approximately 1.04 miles (5,840 feet) upstream of Reach 1. Reach 2 is not subject to overtopping by flood flows but is subject to severe erosion of the toe of both east and west creek banks such that extensive bank failure has occurred due to undermining (refer to the Appendix for photos). Also, a serious erosion problem exists at the abutments and center piers of the West Dana Avenue bridge.

In this reach of the creek, another mechanism of bank failure exists in addition to failure by undermining of the bank. Upper banks are subject to slumping due to insufficient shear strength when saturated, such that progressive bank failure is occurring which cannot practically be prevented. (Refer again to Appendix for photos). This slumping, together with erosion due to sheet flow from adjoining properties will eventually result in a predictable channel cross section.

Long-term measures to abate this erosive condition in Reach 2 will be proposed in a future planning study. In the interim, the District will perform annual channel maintenance to control further erosion of the toe of bank, where the District has right of way.

Any structures lying within delineated hazard area to be mapped by the U. S. Department of Housing and Urban Development, may be eligible for federally subsidized flood insurance. Even though the hazard is erosion rather than flooding, the recently enacted Flood Disaster Protection Act of 1973 includes erosion-caused structural damage and provides reasonably priced insurance. Reference is made to the Appendix for details of the Act.

Reach 3 (Sheets 5 and 6)

Reach 3 extends for approximately 0.53 miles (2,845 feet) upstream of Reach 2. No flooding problem exists in this reach for one-percent flood conditions. However, on the west bank of the creek, in the area of Pastel Lane, Franklin Avenue, and

Diericx Drive (Station 77+25 to approximately Station 105+70) a severe bank erosion and upper bank sloughing problem exists, as in Reach 3, to the extent that several homes are endangered.

It is proposed to maintain the existing toe of both banks with rock protection against undermining. A "future District right of way" line on the west bank has been delineated on the plans to show those homes most endangered. Each affected home within this line would be purchased by the District when the homeowner desired to sell or when the home is sufficiently threatened by bank failure. (See Appendix, Relocation Assistance)

For now, two critically threatened homes are recommended for immediate District purchase and so noted on the plans as the Maxwell and Musser residences.

The east bank will be maintained on an annual basis with long-term measures to be addressed in the future planning study.

Reference is made to the Alternatives Section for alternatives considered for this reach.

Reach 4 (Sheets 6 through 10)

Reach 4 extends for approximately 2.6 miles (13,730 feet) upstream of Reach 3. Again, as in Reach 3, no flood hazard exists for 100-year flood conditions, however, a bank erosion condition exists. Long-term measures to abate this problem will be addressed in a future planning study. In the interim, annual channel maintenance will be performed where the District has right of way.

Reach 5 (Sheets 10 and 11)

Reach 5 extends for about 0.45 miles (2,360 feet) upstream of Reach 4, and ends at the upstream end of the existing culvert at Highway 280. ~~It is proposed to alleviate the severe flood hazard which exists upstream by constructing two 14-foot diameter concrete culverts under the freeway to supplement the flood-carrying capacity of the existing 22-foot diameter culvert.~~ At the time the Highway 280 culvert was designed, the concept for safe conveyance of flood flows for the upstream reach of Stevens Creek was to construct an excavated earth channel with drop structures which would require removal of all vegetation and trees. Also the estimate of the design flood flow at that time was smaller. Under these conditions the culvert was adequately sized.

Constructing the [redacted] additional culvert[redacted] will lower the upstream water surface four feet for the design flow. This effect is localized to the immediate area upstream of the culvert entrance and gradually tapers to zero effect about 2,000 feet upstream.

For the balance of this reach between Homestead Road and Highway 280 it is proposed to obtain adequate right of way to properly maintain the creek in its present setting. The right of way would be an easement over the areas required to allow access and maintenance activity and would be obtained at such time as adjoining property owners expressed the desire for such work. Reference is made to the Alternatives section for alternatives considered.

Reach 6 (Sheets 11 and 12)

Reach 6 extends for 4,900 feet upstream of the proposed enlarged culvert opening at Highway 280, and ends at Stevens Creek Boulevard. A flood hazard exists in this reach due to the intense urbanization existing in the floodplain area. The existing flow capacity of the natural channel in this reach is about 1700 cubic feet per second as compared to the estimated 100-year (one percent) flood peak of about 6500 cubic feet per second. The current value of the properties that would be affected by the one percent flood is about 9.4 million dollars. This includes the value of the 163 homes which would probably be flooded during the one-percent flood. Refer to Table 2 for a tabulation of affected properties under existing conditions.

Historically, the area has been flooded in recent times. In 1955, before the present density of houses existed (1964) the area was under water during a major storm. It is estimated that this was a five percent flood, the flow that has a five percent chance of being equaled or exceeded in any one year (the so-called 20-year flood event).

Recommended measures to deal with the flood problem in Reach 6 are both structural and non-structural. Structural improvements to lessen the flooding limits were discussed in Reach

5; that is enlargement of the culvert opening under Highway 280 ~~by construction of two additional 14-foot diameter culverts.~~ This will reduce average depths of flooding in the floodplain areas near Highway 280 to the range of 1 to 3 feet as opposed to the 6 to 9 feet depths which would exist if the Highway 280 opening is not enlarged. Flood waters will get out of bank on the average of once in 15 years. Refer to Table 2 for properties affected after construction of additional culverts under Highway 280.

TABLE 2

Number of Properties Affected by Flooding in Reach 6

	Existing Condition	With Additional Culverts* Under Highway 280
Total Properties Subject to Flooding From 1% Flood	163	121
Total Properties Subject to Submergence of 3 to 5 feet	52	33
Total Properties Subject to Submergence greater than 5 feet	34	10

*~~Two 14-foot diameter culverts to be constructed adjacent to the existing 22-foot diameter arch culvert.~~

Our assessment of community desires is that the existing park-like setting of the creek be left as natural as possible. This requires that any flood control measures proposed upstream of the highway to Stevens Creek Boulevard be non-structural in nature.

It is proposed, therefore, to delineate the actual area which is subject to flooding from the one-percent flood and to file with the Santa Clara County Recorder a Designated Floodway Map reflecting these inundation lines. In making this flood-prone area between Highway 280 and Stevens Creek Boulevard publicly known, the intent of the proposed plan for this reach will be realized. That is, a potentially hazardous flooding condition will be made known to present as well as future owners of the affected residences, since the Designated Floodway Map will be referred to in each title report and deed. The Designated Floodway Map delineates the boundaries of a potentially hazardous area but is not specific as to magnitudes of flood flows, depths, or expected damage.

Any structures lying within the delineated hazard area to be mapped by the U. S. Department of Housing and Urban Development, may be eligible for federally subsidized flood insurance. Reference is made to the Appendix for details of the Act.

Considering the values of the homes affected in Reach 6 as well as the depths of water expected to occur during the peak flood flows, it can be assumed that the full limit of coverage allowed under the subsidized rates will be the usual amount of insurance purchased by each homeowner in this area. On the average, then, the annual premium paid by each homeowner can be expected to be $87.50 for the full $35,000 worth of coverage for the home (at $0.25 per hundred) plus $35.00 annually for the full $10,000 coverage for its contents (at $0.35 per hundred). An annual cost of $122.50 ($10.21/month) will buy the maximum single family residential subsidized coverage.

Several homes in Reach 6 are subject to flooding to depths in excess of 5 feet above the natural grade level or 3 feet above the level of the first floor. These homes have been designated on the plans as ones which would be purchased by the District upon notice of intent to sell by the owners. A total of 10 homes are so designated for this reach. (See Appendix, Relocation Assistance)

The District presently has right of way in the form of both fee title ownership and easement for flood control purposes over portions of the creek as delineated on the plans. The District can adequately perform normal maintenance activities only in those areas where such rights of way exist. In the areas of the creek where no District right of way exists, the District would propose to acquire an easement over the existing creek at such time as the property owners request creek maintenance.

Reference is made to the Alternatives Section of this report for alternatives considered for this reach.

Reach 7 (Sheets 12 through 17)

Reach 7 extends approximately 3.0 miles (15,840 feet) upstream of Reach 6, and is subject to flooding as shown on the plans. The City of Cupertino proposes to zone the area as a floodplain district and the limits of the zone are coincident with the limits of the 100-year flood. As long as this zone is maintained, there is no need for a flood protection project and the public is assured of appropriate consideration of flooding in any land use proposals.

The existing bridge crossing at McClellan Road is inadequate to convey large flood flows and should be replaced with a longer span structure. If the design flood occurred today, the existing structure would be overtopped to the extent that traffic could not cross. Also, additional flooding would be created upstream as a result of the constricted opening and severe erosion of the abutments would result. The District would propose to share in the cost of a new structure with the City of Cupertino at the time they decide the frequent inundation of McClellan Road should be eliminated.

PROJECT COSTS

Estimates of the construction costs of the proposed channel improvements to Stevens Creek are based upon June, 1974 prices. A contingency item was estimated to account for the costs of engineering, construction inspection, advertising, legal fees, and other contingencies. Estimated costs are presented in Table 3.

PROJECT FINANCING

The financing of the proposed project will be from the ad valorem tax in the North West Zone of the District.

CONSTRUCTION STAGING

Measures proposed for the major portion of Stevens Creek in the project reaches involve annual maintenance of the existing channel, and purchase of homes, and will be accomplished through normal annual budgeting of the ad valorem tax revenue for the North West Zone.

The measures recommended for Reach 5, to construct additional culverts under Highway 280 to relieve the flood hazard in Cupertino, should be constructed as soon as tax revenue becomes available.

TABLE 3

ESTIMATED PROJECT COSTS

Reach	Station Limits	Construction	Engineering & Contingencies	Right of Way (2)	Total
1	0+00 to 22+00	*	-	-	-
2	22+00 to 77+25	*	-	-	-
3	77+25 to 105+70	*	-	$1,014,000	$1,014,000
4	105+70 to 243+00	*	-	-	-
5	243+00 to 266+60	$ 1,100,000 ~~$725,000~~	$ 390,000 ~~$254,000~~	$ 20,000 ~~69,000~~	$ 1,520,000 ~~1,048,000~~
6	266+60 to 315+60	*	-	627,000	627,000
7	315+60 to 474+00	82,200 (1)	28,800	-	111,000
			TOTAL PROJECT COST		$~~2,800,000~~ $ 3,272,000

---

* Annual channel maintenance costs.

(1) District's share of cost of replacing City of Cupertino's McClellan Road bridge.

(2) Right of way costs shown represent cost of purchase of homes designated on the plans in Reaches 3 and 6.

Right of way cost shown in Reach 5 is for construction of an additional culvert at Highway 280 and purchase of property downstream of Highway 280 to Homestead Road.

ALTERNATIVES

In the course of this planning study several alternatives to the proposed measures were considered. Alternatives which applied to the study reach as a whole were: 1) Do nothing, and 2) operate or modify the existing Stevens Creek Dam and reservoir as a flood control facility to reduce downstream peak flows. A discussion of these two alternatives follows and is in turn followed by a discussion of alternative channel measures proposed for specific project reaches of the creek discussed previously in the report.

Do Nothing Alternative

If the existing creek were left unchanged from its present condition, the following would result:

1. Two reaches, that is Reach 1 in Mountain View and Reach 6 in Cupertino would be subject to flooding from flows which have a two percent and a five percent chance of occurring in any one year, respectively.

2. These and remaining reaches of the creek would be subject to severe erosion of the banks, with resulting threat to the safety of people and homes located close to the creek.

3. Future homeowners would not have benefit of knowledge of the potential hazards.

For these reasons, the "do nothing" alternative is not considered a viable one.

Stevens Creek Reservoir Operation Alternative

Consideration was given to providing flood protection downstream of Stevens Creek Dam by utilizing the dam and reservoir as a flood control facility. The dam was originally constructed as a water conservation facility, therefore, any flood control use now imposed would require either sacrificing annual water conservation capacity to maintain storage available for flood runoff, or increasing the capacity of the existing reservoir to provide both the present water conservation storage volume and a flood runoff storage volume large enough to adequately reduce downstream flood peaks.

Operating the existing reservoir for flood control would require the construction of additional outlets as a means of releasing larger quantities of water than is now possible. This would allow rapid drawdown of reservoir levels to maintain adequate flood runoff storage. The present discharge capacity of the outlet valve is about 200 cfs while the discharge-carrying capacity of the creek in Reach 6 is about 1700 cfs. The maximum discharge capacity of any enlarged outlet works to achieve controlled releases without having to provide flood protection downstream would therefore be limited to 1700 cfs.

Assuming the reservoir to be empty at the onset of the 100-year flood, the peak outflow was computed to be 2800 cfs when both the spillway and modified outlets are considered operative.

This means that the present volume of the reservoir is not large enough to reduce downstream discharge adequately to avoid some flood protection in Reach 6. Given the condition whereby the reservoir is not empty at the beginning of the design flood, even higher discharges can be expected.

If the reservoir is operated entirely as a flood control facility (i.e., reservoir-empty condition), about 2600 acre-feet of conservation water will be lost on an average every year. This is equivalent to an annual loss of $260,000, considering that the water from the alternative source of supply would be available at a price around $100 per acre-foot. This is equivalent to a capital investment of about $4,333,000 at an interest rate of six percent per year. Further, the construction cost of the additional outlet capacity needed is estimated to be $250,000. If geologic or foundation conditions prove the least costly alternative of providing this additional outlet capacity to be infeasible, the cost could be $1,000,000 or more. Thus, the total cost of operating the reservoir entirely as a flood control facility would vary from $4,583,000 to $5,333,000.

Consideration was also given to increasing the storage capacity of the reservoir by raising the existing dam, thereby allowing storage of storm runoff and reduction of downstream peak flows, while retaining the present annual water conservation storage of 3600 acre-feet. Raising the height of the dam 30 feet as an example, will increase the total storage capacity from 3600 acre-feet to 7200 acre-feet. With this increased storage capacity, it is possible to route the 100-year flood through the reservoir without any spillover by controlling the peak outflow from the proposed outlets to 1700 cfs.

The cost of raising the dam 30 feet is estimated to be $3,807,000 including relocation of Stevens Canyon Road and construction of additional outlets. It may be noted here that only hydrologic and hydraulic feasibility has been considered in this analysis. Geologic feasibility of raising the dam and enlarging the outlet works would still require investigation.

Considering the equivalent costs of both operating the existing reservoir as a flood control facility or raising the existing dam for use as both a flood control and water conservation facility, as well as the estimated cost of annual damage to flood-prone areas in Reach 6, it would not be economically justified to pursue the solution to flood problems along these lines.

Also, due to the proximity of the San Andreas Fault (2½ miles south of the dam), it may be that the cost of enlargement would be considerably higher to assure the safety of the downstream areas in the event of a large magnitude earthquake.

Alternatives to Measures Proposed in Project Reaches

Reach 3

Since no flooding hazard exists in Reach 3, alternatives considered addressed themselves to abating the erosion problem. The following alternatives were considered for the reach near Pastel Lane, Franklin Avenue, and Diericx Drive in which homes are threatened:

1. Construct a trapezoidal concrete channel with energy dissipator.

Cost: $1,207,500 for a 2850 foot reach.

2. Construct a vertical-walled concrete channel with energy dissipator.

Cost: $1,610,000

3. Construct an 18 foot by 19 foot concrete box

Cost: $1,840,000

4. Construct a rock-lined trapezoidal channel

Cost: $1,725,000

5. Construct a full-height retaining wall on the west side

Cost: $2,185,000

6. Construct a trapezoidal earth channel with drop structure

Cost: $1,610,000

7. Purchase all affected property (two critical homes purchased now).

Cost: $1,014,000

8. Purchase 4 critically threatened homes and maintain the existing creek on an annual basis. Other adjacent owners accept ongoing erosion of the tops of bank.

Cost: $920,000

9. Construct 700 feet of rock-lined channel at critical areas and maintain the rest of the creek on an annual basis. All adjacent owners accept ongoing erosion of the tops of bank.

Cost $1,006,250

10. Construct a full-height retaining wall at two critically affected homes. Other adjacent owners accept ongoing erosion of the tops of bank.

Cost $995,900

High construction costs associated with most of the structural projects considered above as well as adverse environmental effects resulting from removal of existing bank foliage, disruption of the local community during construction and disruption of local ecology have ruled out structural alternatives as viable possibilities.

For these reasons, the recommended measures for Reach 3 are those indicated in number 7 above; that is, purchase of all homes which are sufficiently endangered by bank failure as well as annual maintenance of the existing creek to abate further erosion of the toe of the banks.

Reach 5

Alternatives considered for Reach 5, to enlarge the discharge carrying capacity of the existing 22-foot diameter arch culvert under Highway 280, included investigation of several different types of culvert structures. ~~The two additional 14-foot culverts proposed represent the most economical and practical project in terms of least disruption to traffic and local environment.~~

Reach 6

Alternatives considered for Reach 6 include the following:

1. Do nothing. This approach would leave a flood risk existing to 163 homes in the area with equivalent annual damages of $70,000 due to all floods up to 100-year frequency.

2. Assuming culverts recommended for Reach 5 are constructed under Highway 280, floodwalls could be constructed on the banks to eliminate the flood hazard completely. This would require 6½ foot high walls (maximum) and would allow most of the creek to remain in a nutural state. However, it would require removal of about 250 trees and purchase of 10 homes for a total project cost of about $2,128,000.

3. Construct a rectangular concrete channel with a maintenance road on one side. This would produce a stable, non-eroding channel which could be easily maintained. However, it would destroy the natural setting of the creek and require removal

of about 250 trees. In some areas, maintenance roads will be about 2 feet higher than surrounding ground. Project cost would be about $2,916,000.

4. Construct a trapezoidal concrete channel with a maintenance road on one side. This has the same consequences as the above Alternative 3 and would require removal of about 300 trees. Project cost would be about $1,179,000.

5. Construct a trapezoidal gabion-lined channel with a maintenance road on one side. This would have the same favorable features as Alternatives 3 and 4. However, it would require removal of about 400 trees and would destroy the natural setting. It would also require the purchase of 3 homes. Project cost is estimated to be about $1,539,000.

6. Construct a trapezoidal sacked riprap channel with a maintenance road on one side. This would have the same results as Alternative 5. Project cost is estimated to be about $1,547,000.

7. Construct a double 13 feet by 13 feet reinforced concrete box culvert in Creston Drive to divert 5125 cfs while allowing 1700 cfs to flow in the creek. This would allow the existing creek setting to remain undisturbed and would eliminate the flood hazard. It would cause some inconvenience to homeowners during construction and would require relocation of most of the utilities along Creston Drive. Project cost is estimated to be about $6,875,000.

8. Construct a flood detention basin at Stevens Creek Boulevard and construct floodwalls between Stevens Creek Boulevard and Highway 280. This would reduce the estimated flood peak from 6825 cfs to 5600 cfs (this is equivalent to the 50-year flood peak). Since the reduction in flood peak afforded by the detention basin is not large, additional flood protection measures, such as floodwalls, would be required between Stevens Creek Boulevard and Highway 280. Purchase of 32 homes would be necessary, and about 400 trees would need to be removed. Project cost is estimated to be about $7,101,000.

CONCLUSIONS AND RECOMMENDATIONS

As a result of the investigation of Stevens Creek between Central Avenue in Mountain View and Stevens Creek Dam reported herein, it is concluded that:

1. The existing channel is not adequate to convey the design flood flows in two reaches:

   a. Between Central Avenue and West Dana Avenue.

   b. Between Highway 280 and the foothills, approximately 2.7 miles upstream.

2. Due to the natural bottom slope and also due to the nature of the soils existing in the creek banks, a severe erosive condition exists in several reaches of the creek.

3. Because of the nature of the soils and the proximity of homes to the banks a hazardous condition exists due to bank failure in some creek reaches.

4. There are available means, as presented in the report, to either control the flooding hazard or to make available means of compensation for loss due to flooding.

5. The estimated total cost for the proposed project including construction, engineering, right of way and contingencies is $2,800,000.

It is recommended that the improvements be implemented as proposed for the Project Reaches 3, 5, and 6.

Submitted by:

for Stanley N. Wolf

W. F. Carlsen
Division Engineer
Predesign Division

Approval Recommended:

John L. Richardson

John L. Richardson
Head, Project Development Branch
Design and Construction

Approved:

George Korbay

George Korbay
Design and Construction Manager

APPENDIX

Federally Subsidized Flood Insurance

The Flood Disaster Protection Act of 1973 signed into law on December 31, 1973 substantially expanded the benefits and scope of the National Flood Insurance Program originally enacted in 1968. The Act makes available reasonably priced flood insurance to individuals at the subsidized rate of $0.25 per $100 of of coverage for single family residential structures (see Table 4 for rates and coverage). It also broadens the scope of insurance coverage by specifically including erosion losses caused by abnormal water levels and flood-related mudflow losses. These subsidized rates are available for all construction begun before December 31, 1974 or the date when the detailed rate and elevation studies are completed whichever is later. For all construction begun after such date, the full actuarial rate - which may be five to ten times as high - will be charged.

The Act creates certain incentives for individuals and the community (city) in which they reside to participate in the flood insurance program. Effective July 1, 1975, businesses and individuals in identified flood-prone areas will not have available Federal mortgage insurance, mortgage loans and other lending by Federally insured or regulated financial institutions for construction purposes and other forms of Federal assistance for financing capital costs of construction and equipment unless the city in which they reside has qualified for the program by adopting effective land use and land management controls.

The Act requires the Department of Housing and Urban Development to publish information on known flood-prone communities.

In addition to these incentives for community participation in the program, individuals and businesses in flood-prone areas in participating communities will be required to purchase flood insurance as a precondition of eligibility for Federal mortgage insurance or guarantees, borrowing from Federally insured or regulated financial institutions for construction purposes and receiving other forms of Federal assistance for capital financing.

It should be said that the Act does outline appeal procedures for both individuals and communities desiring to challenge determinations relating to flood levels.

TABLE 4

Summary of Available Flood Insurance Coverage as Set Forth in the Flood Disaster Protection Act of 1973

	Subsidized Coverage		Total Coverage	
	Old Limit	New Limit	Old Limit	New Limit
Single Family Residential	$17,500	$ 35,000	$35,000	$ 70,000
Other Residential	30,000	100,000	60,000	200,000
Nonresidential	30,000	100,000	60,000	200,000
Contents, residential	5,000	10,000	10,000	20,000
Contents, non-residential	5,000	100,000	10,000	200,000

Relocation Assistance Information

Policy

It is the policy of the District that no person shall be displaced in connection with a District project unless and until adequate replacement housing has been provided.

The District has two programs to aid individuals, families, businesses, and farms which must relocate because of a proposed District project.

These are:

(1) THE RELOCATION ADVISORY ASSISTANCE PROGRAM, which is to aid in locating suitable replacement properties, and

(2) THE RELOCATION ASSISTANCE PAYMENTS PROGRAM, which is to reimburse owners and tenants for the costs involved in relocating.

The Relocation Assistance Program

WHAT IT DOES.

The District may be able to help a displaced person or family find a new place to live. The District Office has current information on rental and interest rates. It is also informed as to the availability of FHA-repossessed homes which are offered for resale on a priority basis to persons displaced by public purchase of private property. The District also maintains maps and other information showing the location of schools, parks and other public facilities in your general area. Local real estate brokers and newspapers, however, are the major source of information on properties for sale or rent in most areas.

The Relocation Payment Program

WHAT DOES IT DO?

The Relocation Assistance Payments Program helps pay relocation costs incurred in moving when homes are acquired for a District project. Several different types of payments exist. These are:

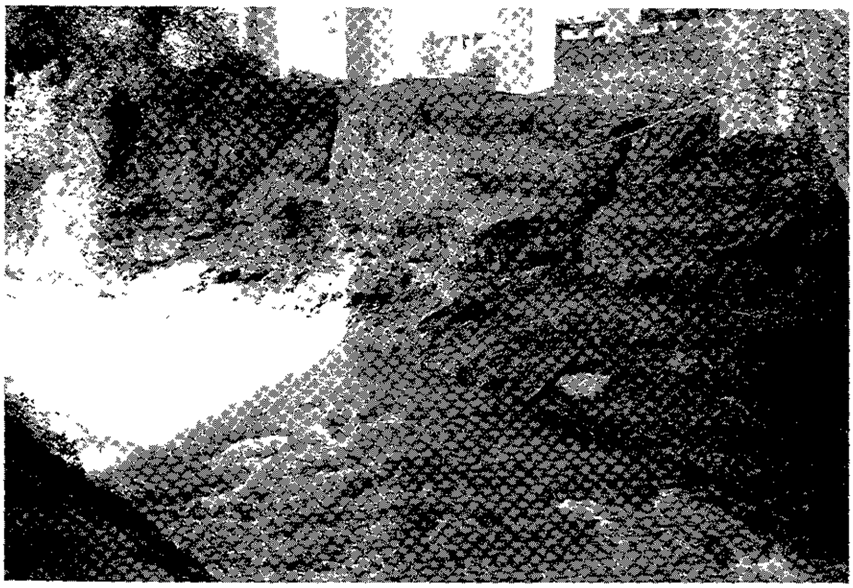
1. Moving Expenses:

   Most homewoners and tenants displaced by a project will be reimbursed for the costs of moving their personal movable property.

2. Replacement Housing:

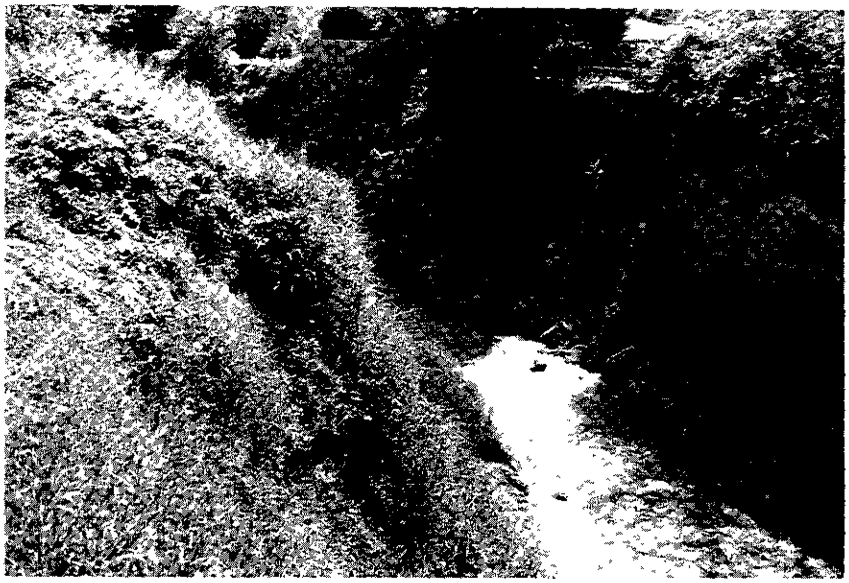
   Long-term owner-occupants of homes who find it hard to buy decent replacement housing (at price levels equal to that which they receive from the District for their homes) may qualify to receive a payment in excess of that paid by the District for their former residences. Long-term owner-occupants may also qualify for payment for some of the INCIDENTAL COSTS incurred in buying a new home. A long-term owner-occupant may also qualify for a payment to cover an INCREASE in the INTEREST cost for financing a replacement home.

STEVENS CREEK



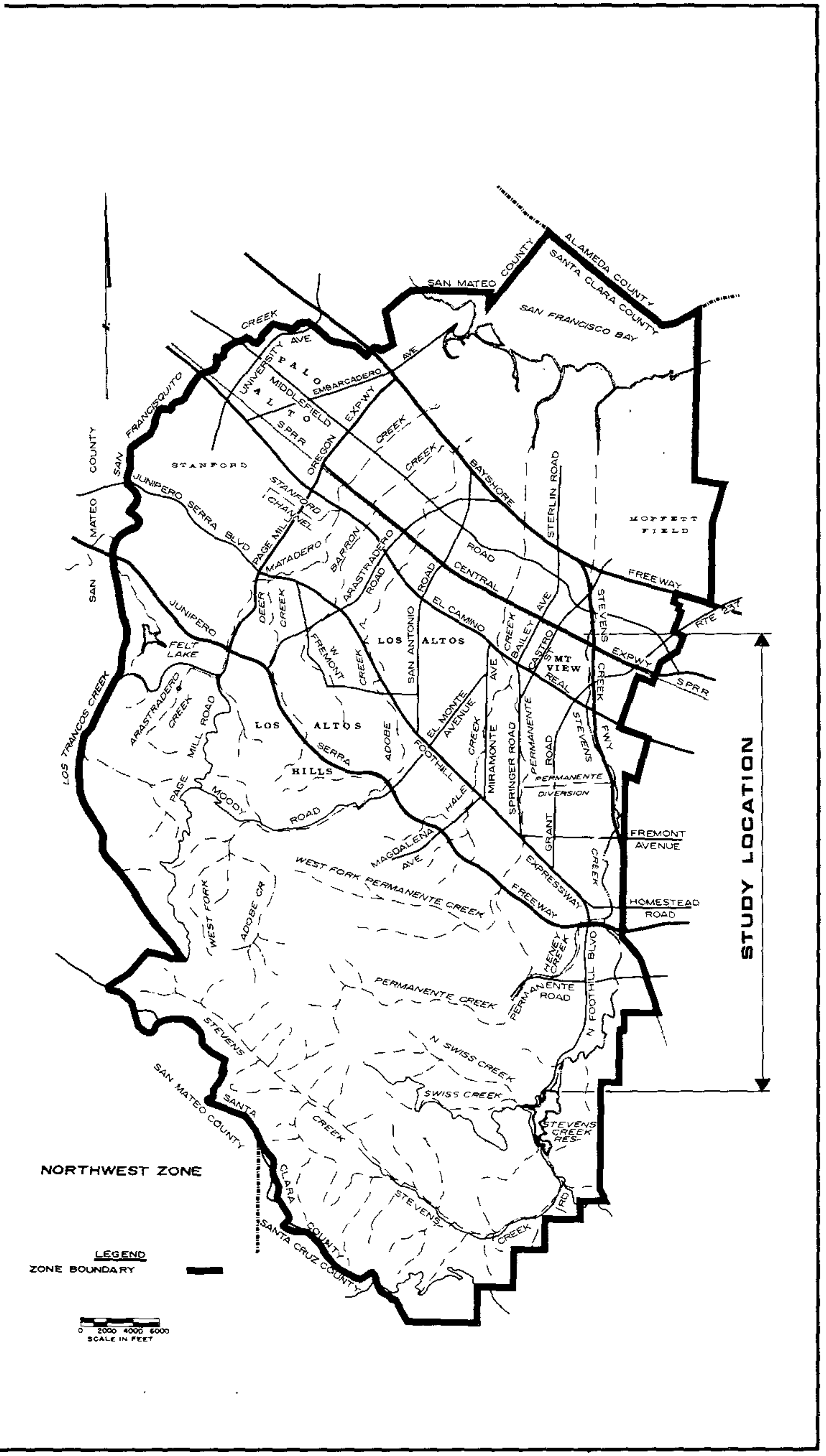
Erosion at center piers
of West Dana Ave. crossing

Eroded west bank downstream
of El Camino Real



Rock bank protection existing
near Diericx Drive (west bank)

Recently placed rock bank protection
near Diericx Drive (west bank)



MAP AND GENERAL PLAN

FOR

STEVENS CREEK

CENTRAL AVE. - MT. VIEW
TO STEVENS CREEK DAM

Santa Clara Valley Water District

NORTHWEST FLOOD CONTROL ZONE

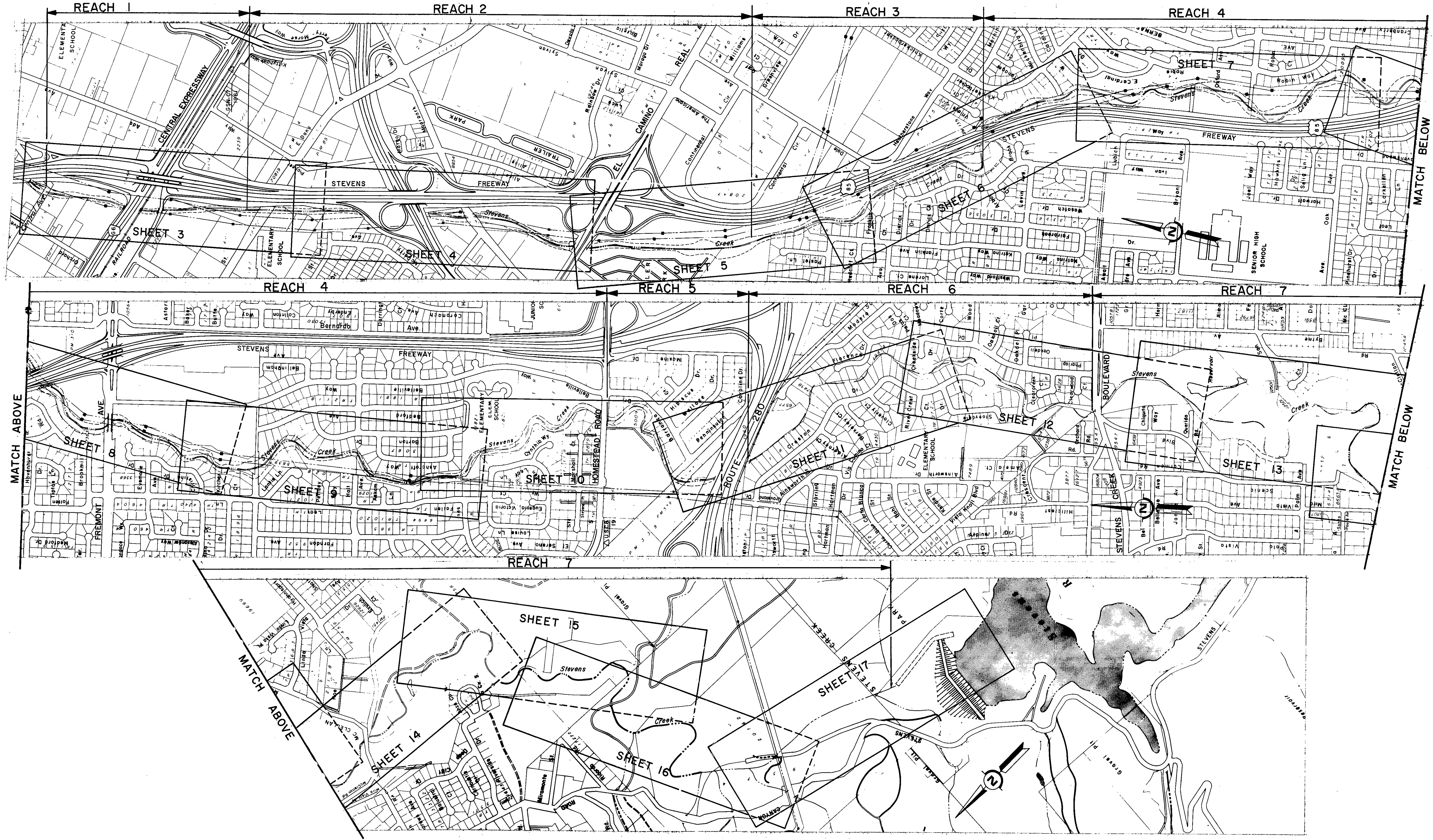
PROJECT NO. 1029

PROJECT APPROVAL.

George Korbay
DESIGN AND CONSTRUCTION MANAGER

Lloyd C Fowler
CHIEF ENGINEER

DATE: JULY 5, 1974



REV.	DESCRIPTION	SUB.	APPR.

REFER TO TRACING FOR LATEST REVISION

REFERENCE INFORMATION AND NOTES

DATE March 18, 74
DESIGN S. N. N.
DRAWN RJB
CHECKED

Santa Clara Valley Water District

ENGINEERING CERTIFICATION
Stanley A. Wolf
PROJECT ENGINEER
DIVISION ENGINEER R.C.E. NO.

ENGINEERING APPROVAL
John L. Richardson
HEAD, PROJECT DEVELOPMENT BRANCH R.C.E. NO. 17646

INDEX MAP
STEVENS CREEK

SCALE
1" = 500'

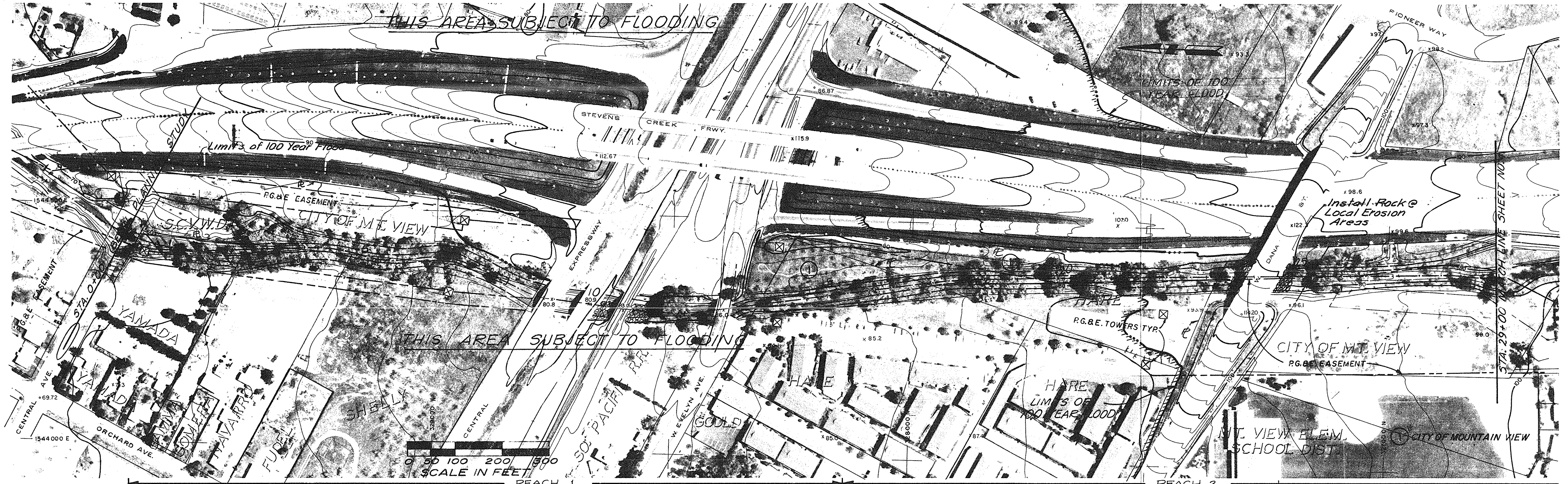
SHEET
2
OF 17

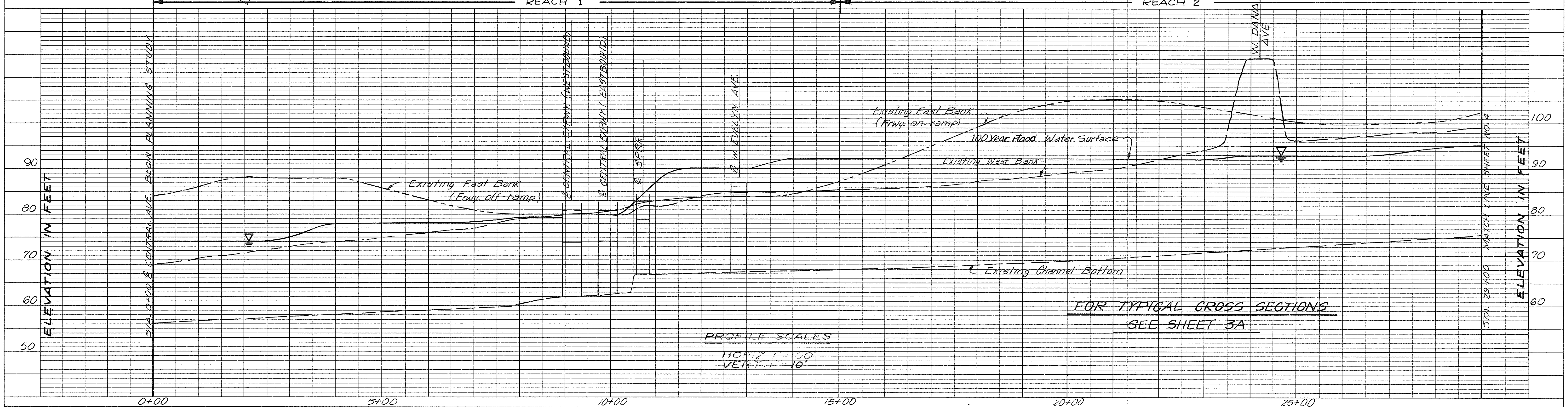
3. Rental Differential:

Tennants and "short-term" owner-occupants unable to rent suitable housing at price levels equal to the rent they are paying at the time they move may qualify to receive a rental housing payment to help pay the higher rent.

4. Down Payments:

Tenants and "short-term" owner-occupants may decide to buy a new home rather than rent. If they buy they may be able to receive money from the District to use as down payment on a replacement home. This payment then replaces the rental differential.





REV.	DESCRIPTION	SUB.	APPR.

REFER TO TRACING FOR LATEST REVISION

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TOPOGRAPHY FROM PHOTOGRAPHY DATED 11-11-69
BASIS OF ELEVATIONS USC&GS 1929 DATUM ADJUSTED 1966/67
BASIS OF GRID CALIFORNIA COORDINATE SYSTEM, ZONE 3

SCALE 1 INCH = 100 FEET
100 0 100 200 300 400
CONTOUR INTERVAL 2 FEET

COMPILED BY WAHLEN AERIAL SURVEYS W 6940

DATE 7/6/74
DESIGN S.N.W.
DRAWN L.H.
CHECKED

Santa Clara Valley Water District

ENGINEERING CERTIFICATION
Stanley I. Wolfe
PROJECT ENGINEER
DIVISION ENGINEER R.C.E. NO.

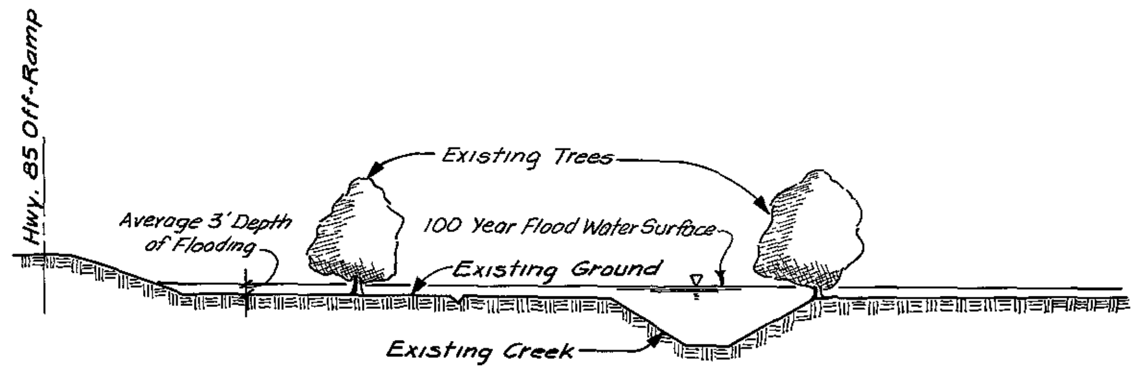
ENGINEERING APPROVAL
John L. Richardson
HEAD, PROJECT DEVELOPMENT BRANCH R.C.E. NO. 17646

MAP AND GENERAL PLANS

ZONE NW - 1 PROJECT NO. 10029

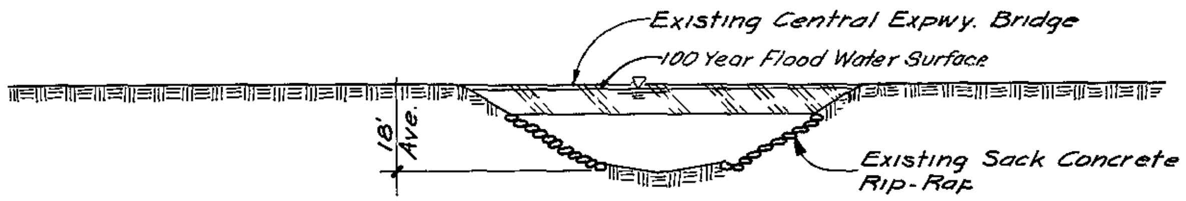
STEVENS CREEK

SCALE As Shown
SHEET 3 OF 17



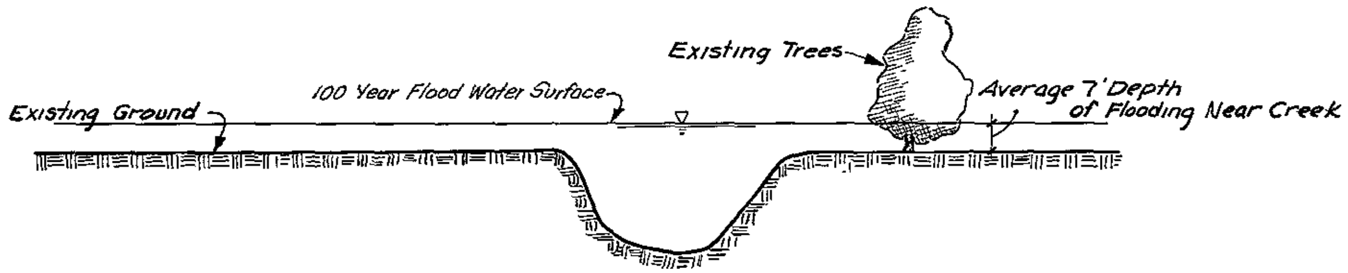
STA. 0+00 to STA. 8+90

Scale: 1"=30'


Existing Central Expwy. Bridge
100 Year Flood Water Surface
18' Ave.
Existing Sack Concrete Rip-Rap

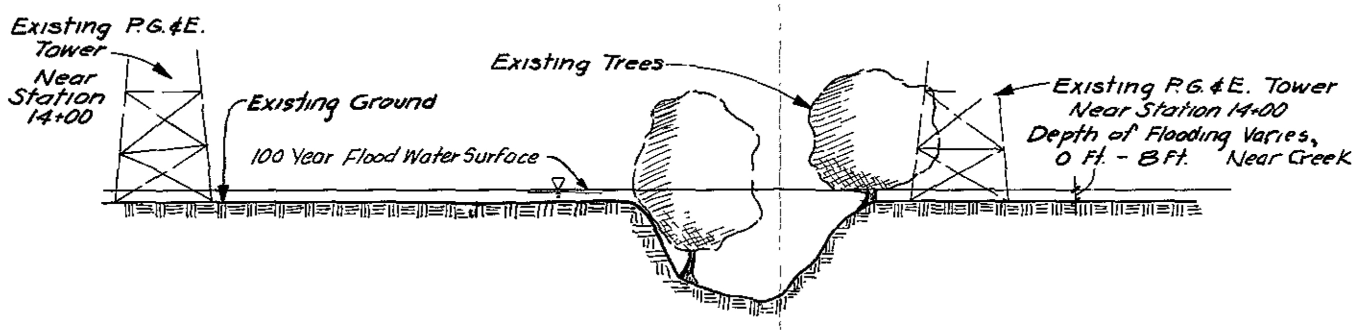
STA. 8+90 to STA. 10+15

Scale: 1"=20'


Existing Trees
Existing Ground
100 Year Flood Water Surface
Average 7' Depth of Flooding Near Creek

STA. 10+15 to STA. 12+00

Scale: 1"=20'


Existing P.G.&E. Tower Near Station 14+00
Existing Ground
100 Year Flood Water Surface
Existing Trees
Existing P.G.&E. Tower Near Station 14+00
Depth of Flooding Varies, 0 Ft. - 8 Ft. Near Creek

STA. 12+00 to STA. 22+00

Scale: 1"=20'

Note: 1. For Plan See Sheet 3
2. Sections Shown Are Oriented Looking Upstream.

TYPICAL SECTIONS REACH 1

REFER TO TRACING FOR LATEST REVISION			
REV	DESCRIPTION	SUB	APPR

REFERENCE INFORMATION AND NOTES

DATE 5-6-74
DESIGN S.N.W.
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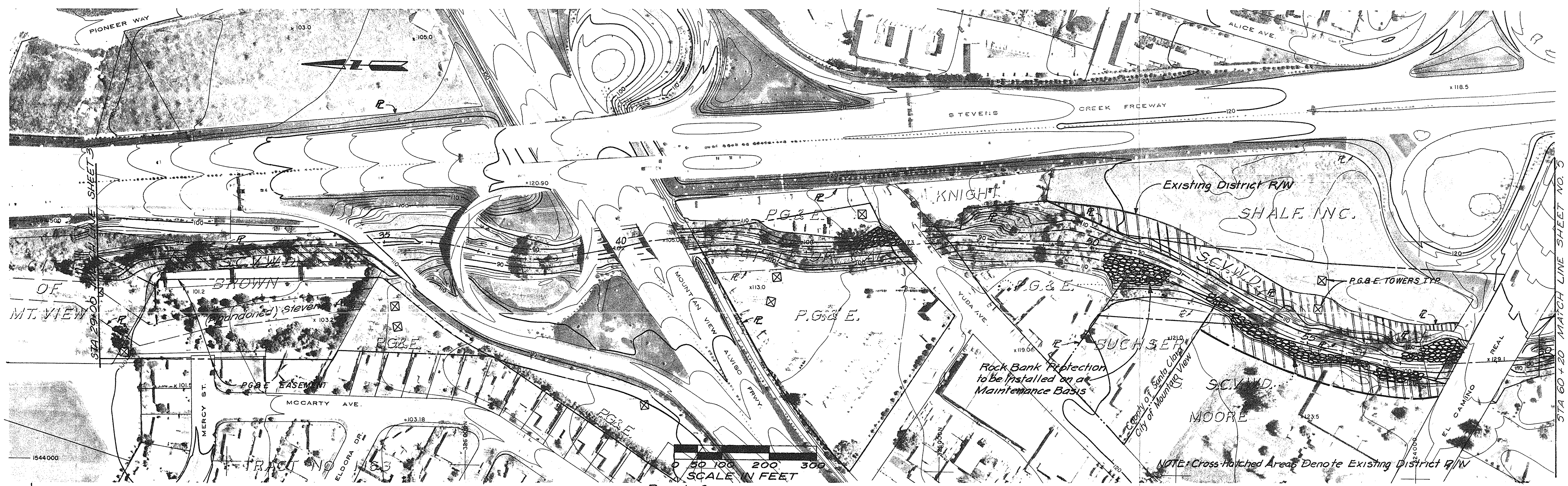
Santa Clara Valley Water District

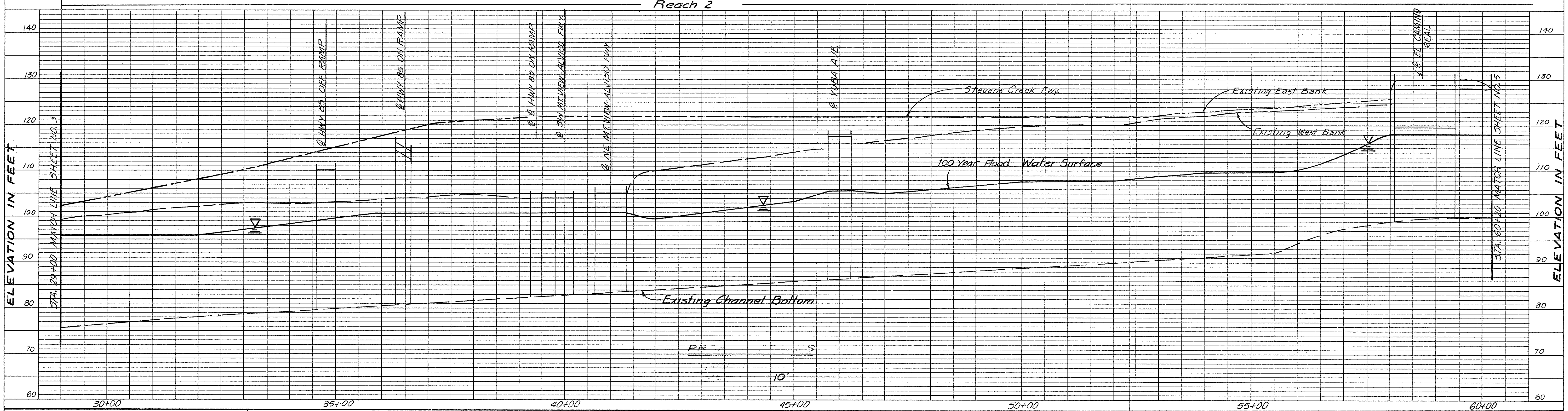
ENGINEERING CERTIFICATION
Stanley N. Wolf
PROJECT ENGINEER
DIVISION ENGINEER R.C.E. NO. 15851

ENGINEERING APPROVAL
John L. Richardson
HEAD DESIGN BRANCH R.C.E. NO. 14455

MAP AND GENERAL PLANS
ZONE NW - 1 PROJECT NO. 10029
STEVENS CREEK

SCALE AS SHOWN
SHEET 3A OF 17





REFER TO TRACING FOR LATEST REVISION

REV.	DESCRIPTION	SUB.	APPR.

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TOPOGRAPHY FROM PHOTOGRAPHY DATED 11-11-69
BASIS OF ELEVATIONS USC&GS 1929 DATUM ADJUSTED 1966/67
BASIS OF GRID CALIFORNIA COORDINATE SYSTEM, ZONE 3

SCALE 1 INCH = 100 FEET
100 0 100 200 300 400
CONTOUR INTERVAL 2 FEET

COMPILED BY WAHLEN AERIAL SURVEYS W 6940

DATE 7/3/74
DESIGN S.N.W.
DRAWN L.H.
CHECKED

Santa Clara Valley Water District

ENGINEERING CERTIFICATION
Stanley N. Wolfe
PROJECT ENGINEER
DIVISION ENGINEER R.C.E. NO.

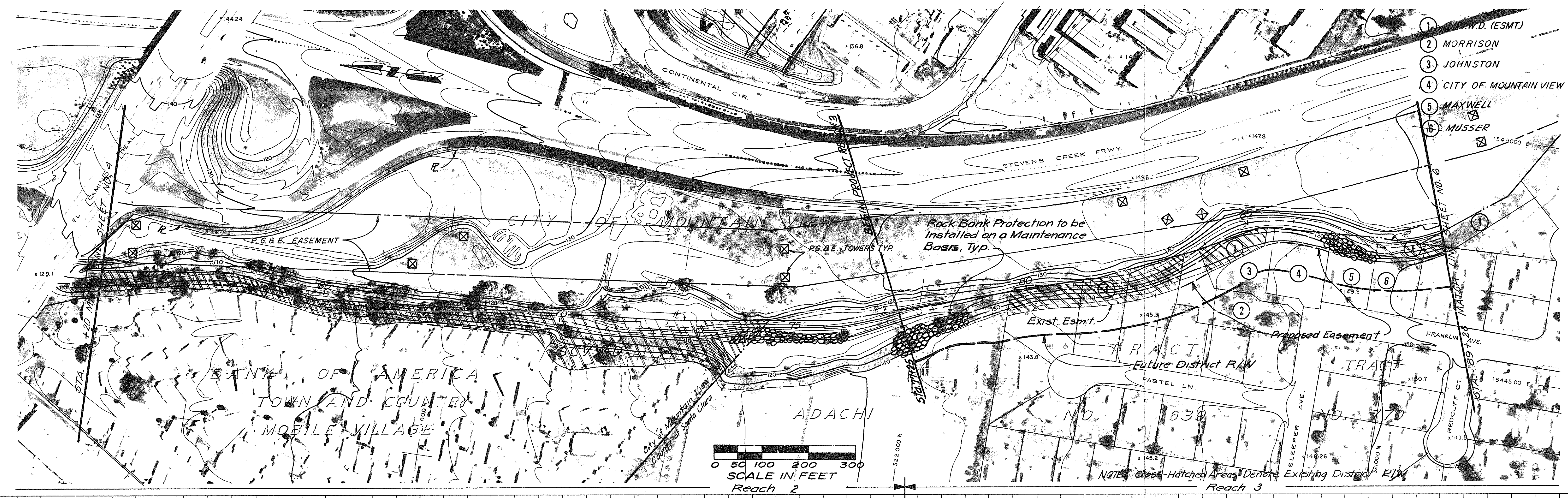
ENGINEERING APPROVAL
John L. Richardson
HEAD, PROJECT DEVELOPMENT BRANCH R.C.E. NO. 17646

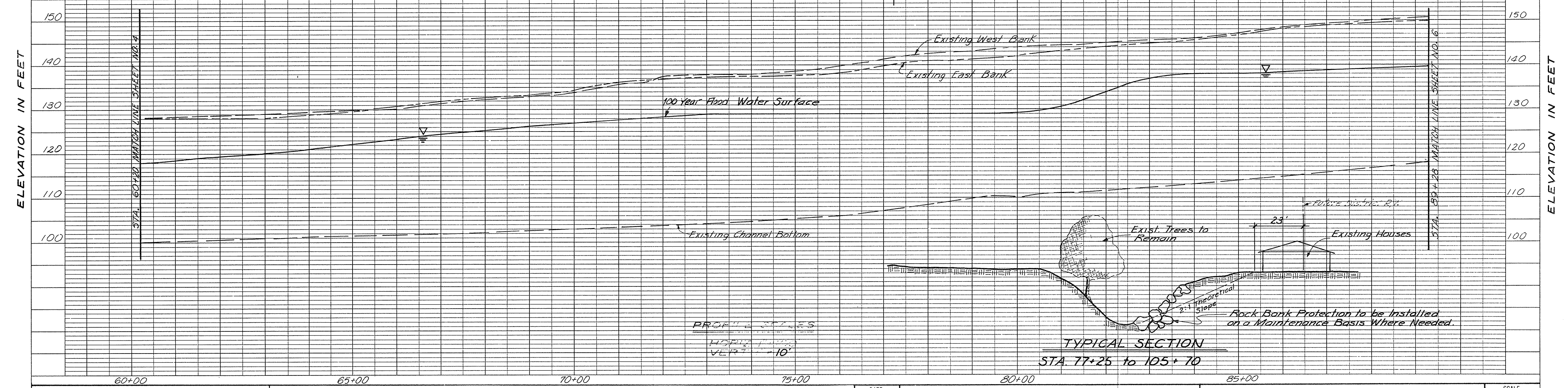
MAP AND GENERAL PLANS

ZONE NW - 1 **PROJECT NO. 10029**

STEVENS CREEK

SCALE As Shown
SHEET 4 OF 17





TYPICAL SECTION
STA. 77+25 to 105+70

REFER TO TRACING FOR LATEST REVISION

REV.	DESCRIPTION	SUB.	APPR.

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TOPOGRAPHY FROM PHOTOGRAPHY DATED 11-11-69
BASIS OF ELEVATIONS USC&GS 1929 DATUM ADJUSTED 1966/67
BASIS OF GRID CALIFORNIA COORDINATE SYSTEM, ZONE 3

SCALE 1 INCH = 100 FEET
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CONTOUR INTERVAL 2 FEET

COMPILED BY WAHLEN AERIAL SURVEYS W6940

DATE 7/3/74
DESIGN S.N.W.
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Santa Clara Valley Water District

ENGINEERING CERTIFICATION
Stanley N. Wolf
PROJECT ENGINEER
DIVISION ENGINEER R.C.E. NO.

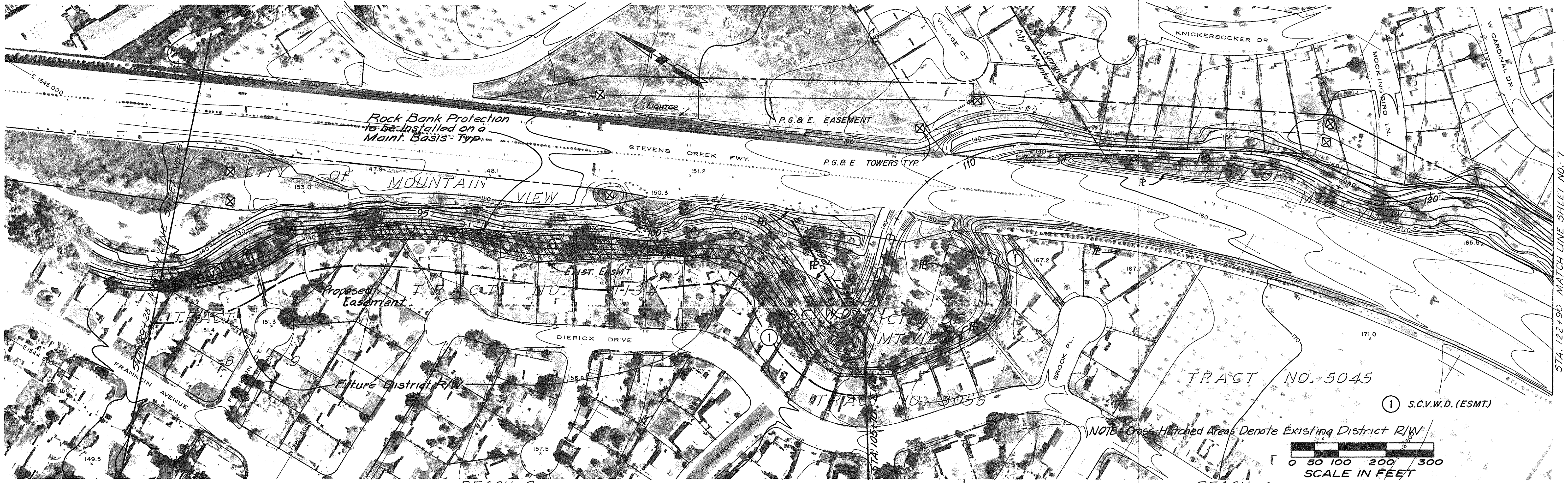
ENGINEERING APPROVAL
John L. Richardson
HEAD, PROJECT DEVELOPMENT BRANCH R.C.E. NO. 17646

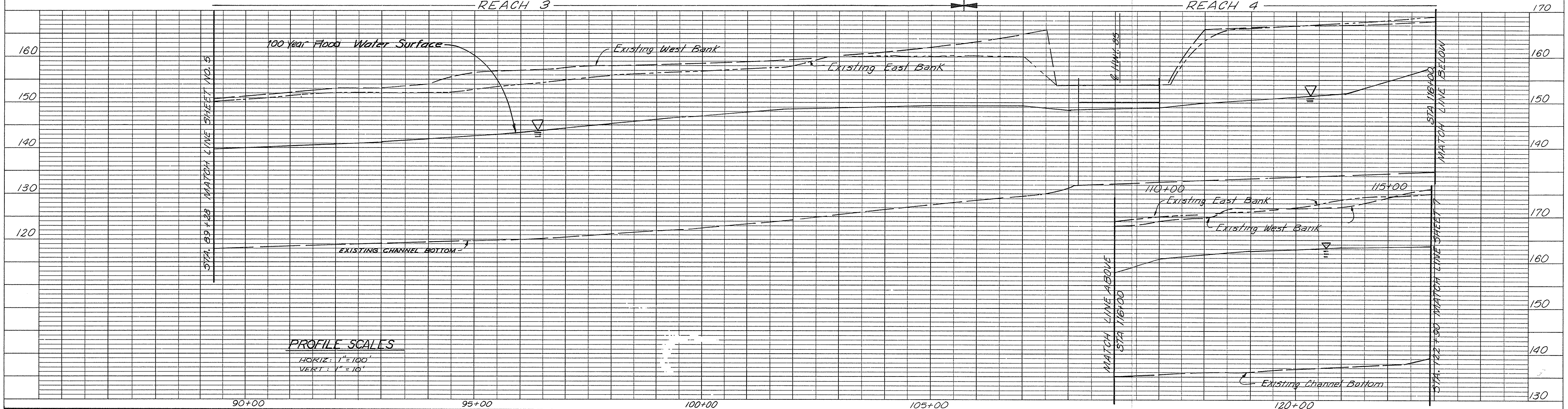
MAP AND GENERAL PLANS

ZONE NW-1 **PROJECT NO. 10029**

STEVENS CREEK

SCALE As Shown
SHEET 5 OF 17





REFER TO TRACING FOR LATEST REVISION

REV.	DESCRIPTION	SUB.	APPR.

PHOTO-IMAGE FROM PHOTOGRAPHY DATED 3-24-70
TOPOGRAPHY FROM PHOTOGRAPHY DATED 11-11-69
BASIS OF ELEVATIONS USC&GS 1929 DATUM ADJUSTED 1966/67
BASIS OF GRID CALIFORNIA COORDINATE SYSTEM, ZONE 3

SCALE 1 INCH = 100 FEET

100 0 100 200 300

CONTOUR INTERVAL 2 FEET

COMPILED BY WAHLEN AERIAL SURVEYS W694

DATE 7/3/74
DESIGN S.N.W.
DRAWN GRS L.H.
CHECKED

Santa Clara Valley Water District

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PROJECT ENGINEER
DIVISION ENGINEER R.C.E. NO.

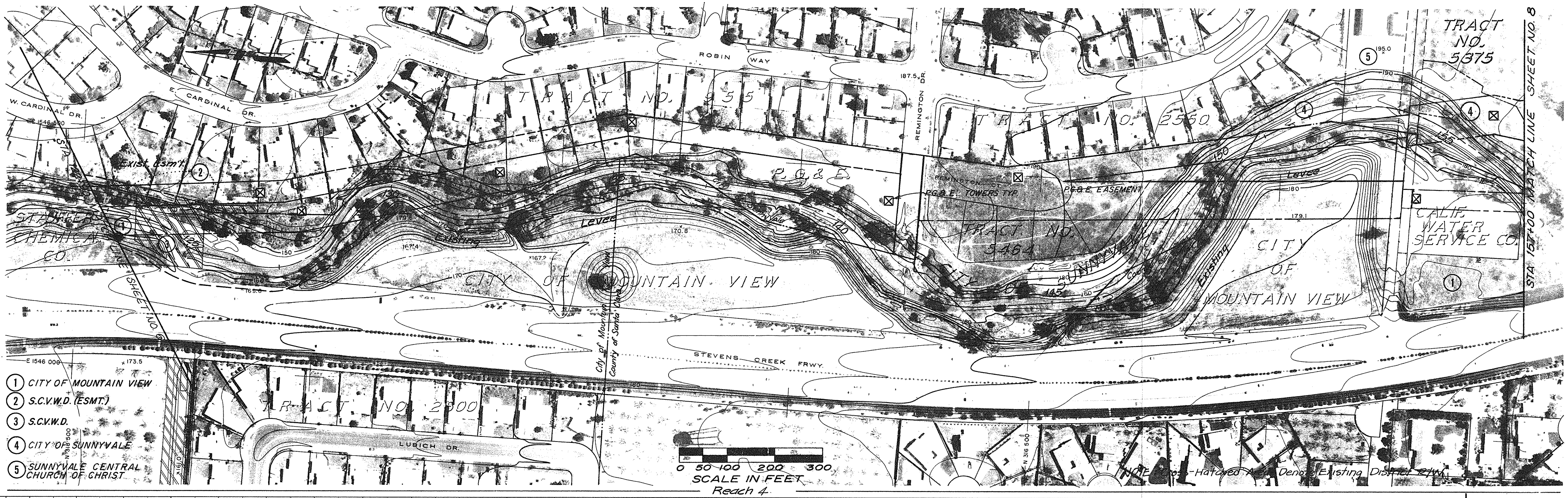
ENGINEERING APPROVAL
John L. Richardson
HEAD, PROJECT DEVELOPMENT BRANCH R.C.E. NO. 17645

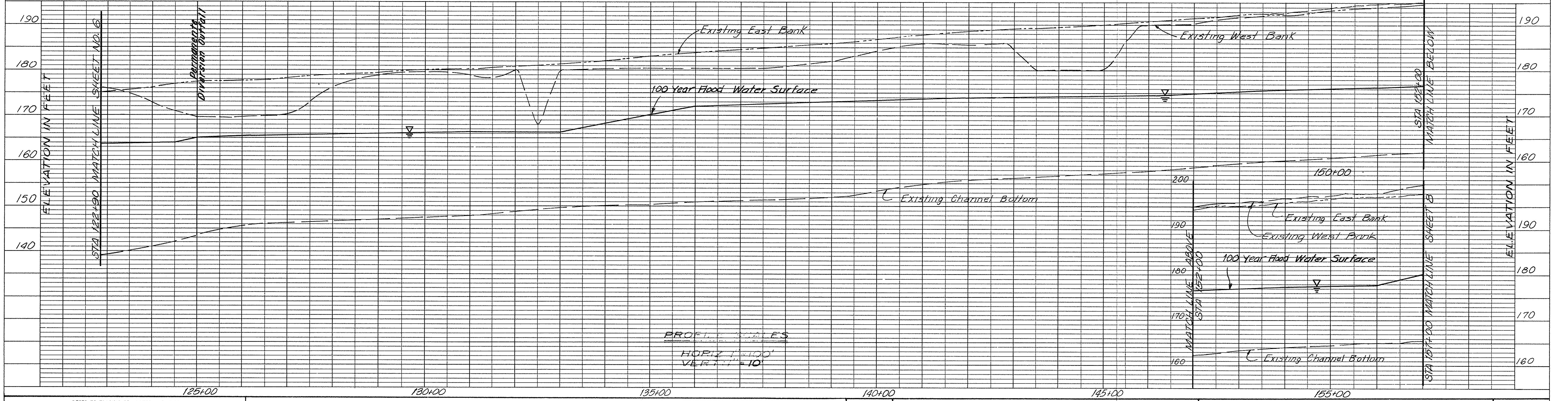
MAP AND GENERAL PLANS

ZONE NW-1 PROJECT NO. 10029

STEVENS CREEK

SCALE As Shown
SHEET 6 OF 17





REFER TO TRACING FOR LATEST REVISION

REV.	DESCRIPTION	SUB.	APPR.

PHOTO-IMAGE FROM PHOTOGRAPHY DATED 3-24-70
TOPOGRAPHY FROM PHOTOGRAPHY DATED 11-11-69
BASIS OF ELEVATIONS USC&GS 1929 DATUM ADJUSTED 1966/67
BASIS OF GRID CALIFORNIA COORDINATE SYSTEM, ZONE 3

SCALE 1 INCH = 100 FEET
100 0 100 200 300 400
CONTOUR INTERVAL 2 FEET

COMPILED BY WAHLEN AERIAL SURVEYS W6940

DATE 7/3/74
DESIGN S.N.W.
DRAWN L.H.
CHECKED

Santa Clara Valley Water District

ENGINEERING CERTIFICATION
Stanley N. Wolf
PROJECT ENGINEER
DIVISION ENGINEER R.C.E. NO.

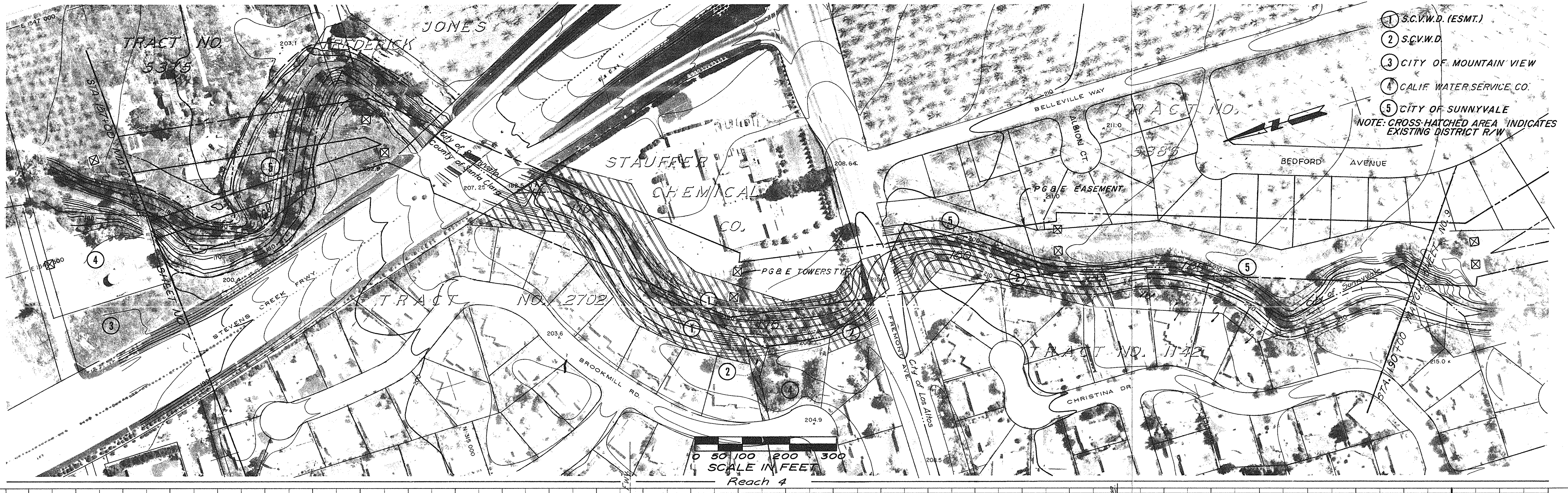
ENGINEERING APPROVAL
John L. Richardson
HEAD, PROJECT DEVELOPMENT BRANCH R.C.E. NO. 17646

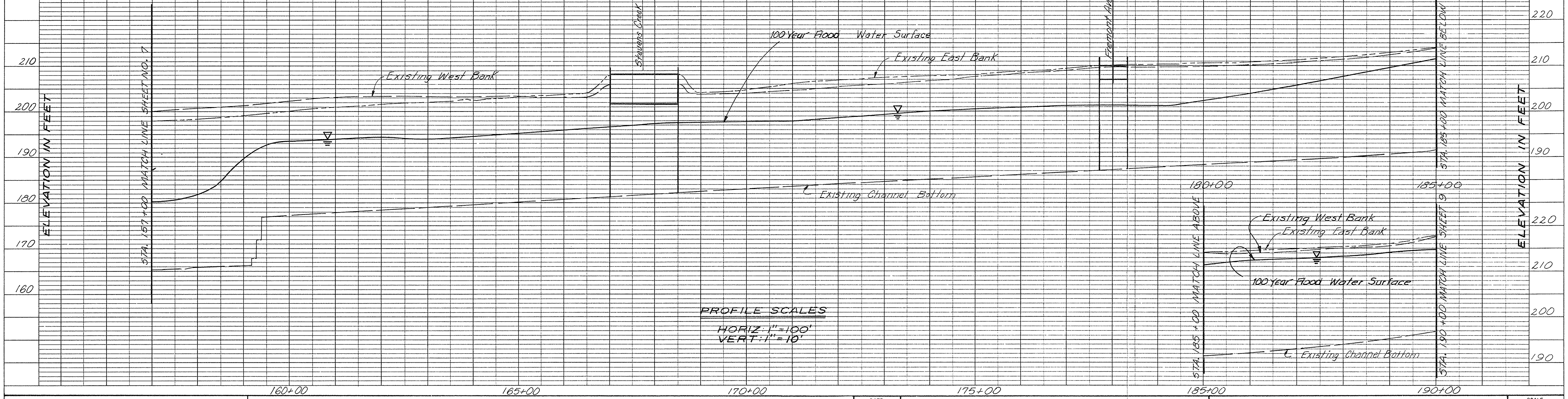
MAP AND GENERAL PLANS

ZONE NW - 1 PROJECT NO. 10029

STEVENS CREEK

SCALE As Shown
SHEET 7 OF 17





REFER TO TRACING FOR LATEST REVISION

REV.	DESCRIPTION	SUB.	APPR.

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SCALE 1 INCH = 100 FEET
100 0 100 200 300 400
CONTOUR INTERVAL 2 FEET

COMPILED BY WAHLEN AERIAL SURVEYS W6940

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DESIGN S.N.W.
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Santa Clara Valley Water District

ENGINEERING CERTIFICATION
Stanley A. W
PROJECT ENGINEER
DIVISION ENGINEER R.C.E. NO.

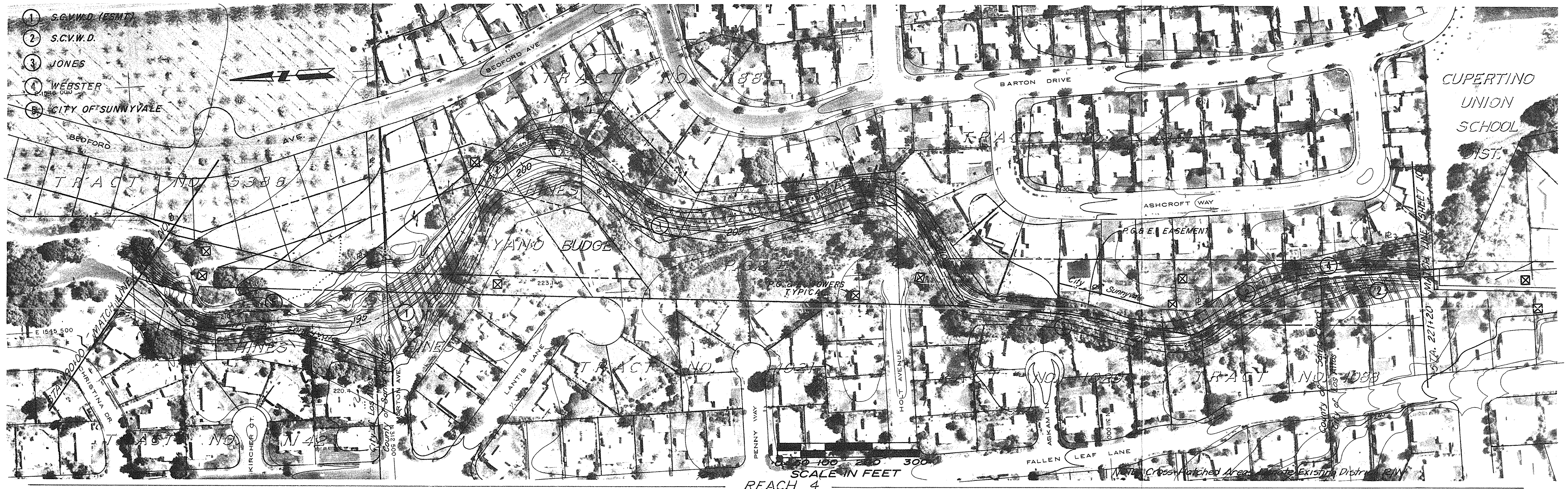
ENGINEERING APPROVAL
John L. Richardson
HEAD, PROJECT DEVELOPMENT BRANCH R.C.E. NO. 17646

MAP AND GENERAL PLANS

ZONE NW - 1 PROJECT NO. 10029

STEVENS CREEK

SCALE As Shown
SHEET 8 OF 17



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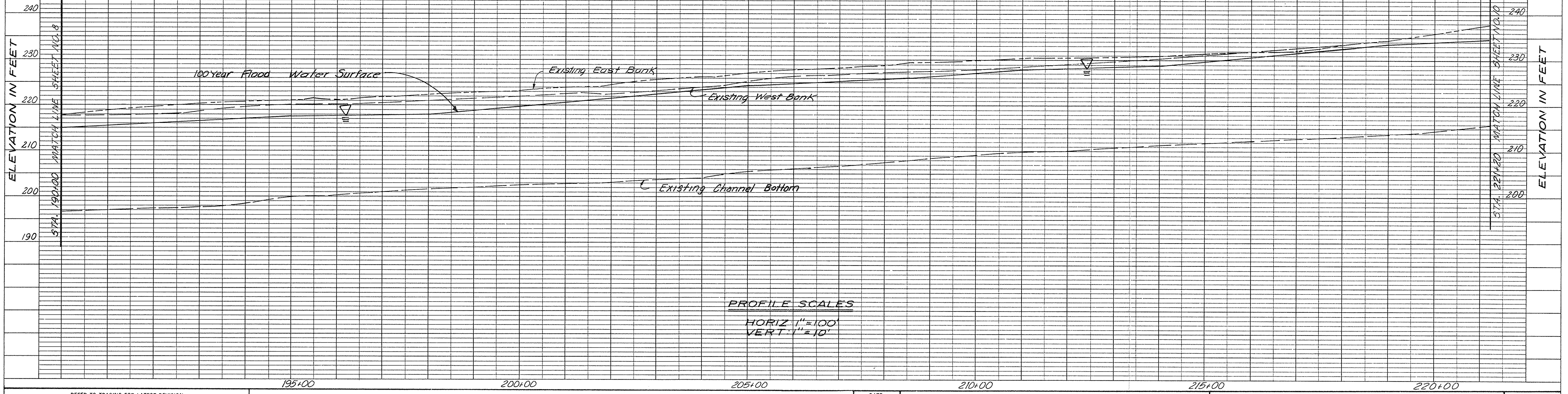

PROFILE SCALES

HORIZ. 1" = 100'
VERT. 1" = 10'

REV.	DESCRIPTION	SUB.	APPR.
	REFER TO TRACING FOR LATEST REVISION		

PHOTO-IMAGE FROM PHOTOGRAPHY DATED 3-24-70
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100 0 100 200 300 400
CONTOUR INTERVAL 2 FEET

COMPILED BY WAHLEN AERIAL SURVEYS W6940

DATE 7/3/74
DESIGN S.N.W.
DRAWN GRS L.H.
CHECKED

Santa Clara Valley Water District

ENGINEERING CERTIFICATION Stanley A. Wolf
PROJECT ENGINEER
DIVISION ENGINEER R.C.E. NO.

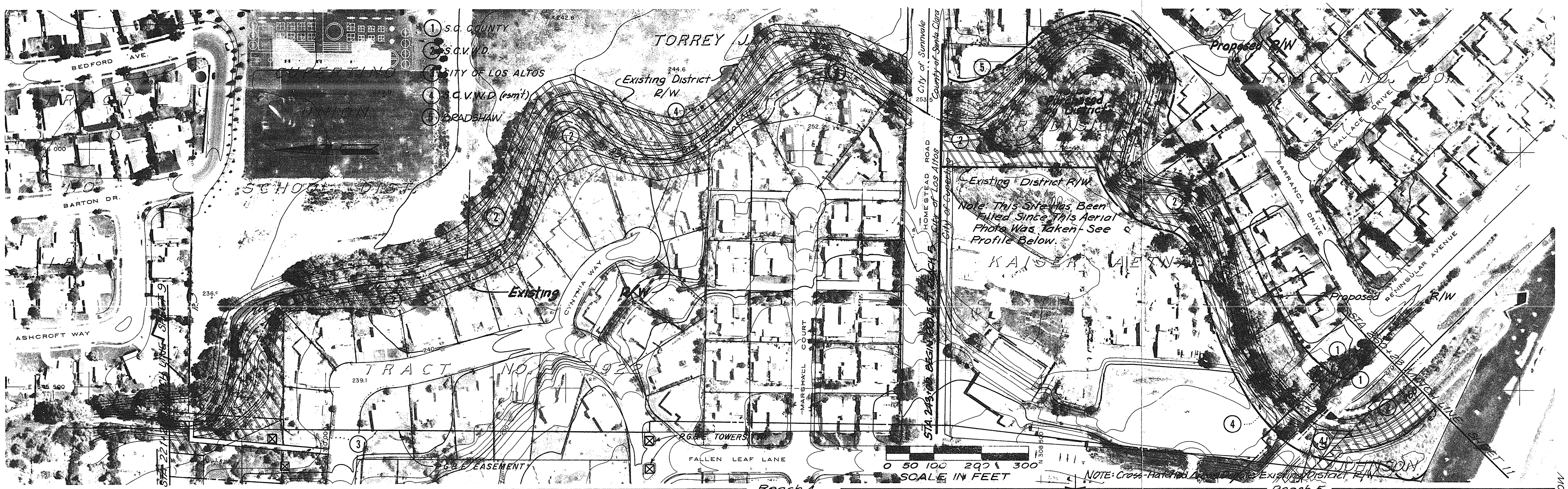
ENGINEERING APPROVAL John L. Richardson
HEAD, PROJECT DEVELOPMENT BRANCH R.C.E. NO. 17646

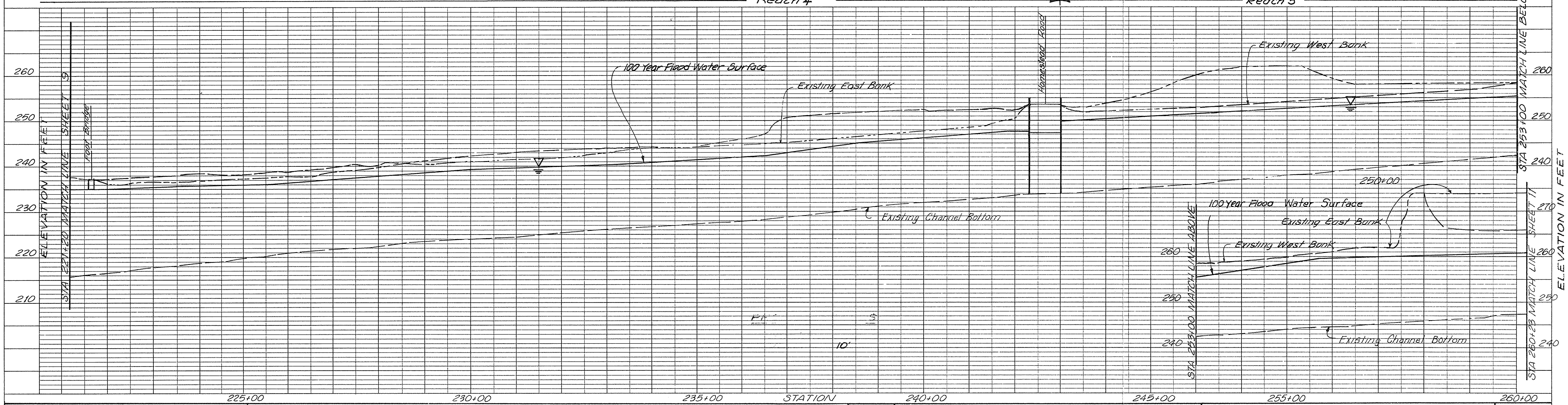
MAP AND GENERAL PLANS

ZONE NW-1 PROJECT NO. 10029

STEVENS CREEK

SCALE As Shown
SHEET 9 OF 17





REV.	DESCRIPTION	SUB.	APPR.

REFER TO TRACING FOR LATEST REVISION

PHOTO-IMAGE FROM PHOTOGRAPHY DATED 3-24-70
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BASIS OF ELEVATIONS USC & GS 1929 DATUM ADJUSTED 1966/67
BASIS OF GRID CALIFORNIA COORDINATE SYSTEM, ZONE 3

SCALE 1 INCH = 100 FEET
100 0 100 200 300 400
CONTOUR INTERVAL 2 FEET

COMPILED BY WAHLEN AERIAL SURVEYS W6940

DATE 7/3/74
DESIGN S.N.W.
DRAWN L.H.
CHECKED

Santa Clara Valley Water District

ENGINEERING
Stanley A. Wolfe
PROJECT ENGINEER
DIVISION ENGINEER

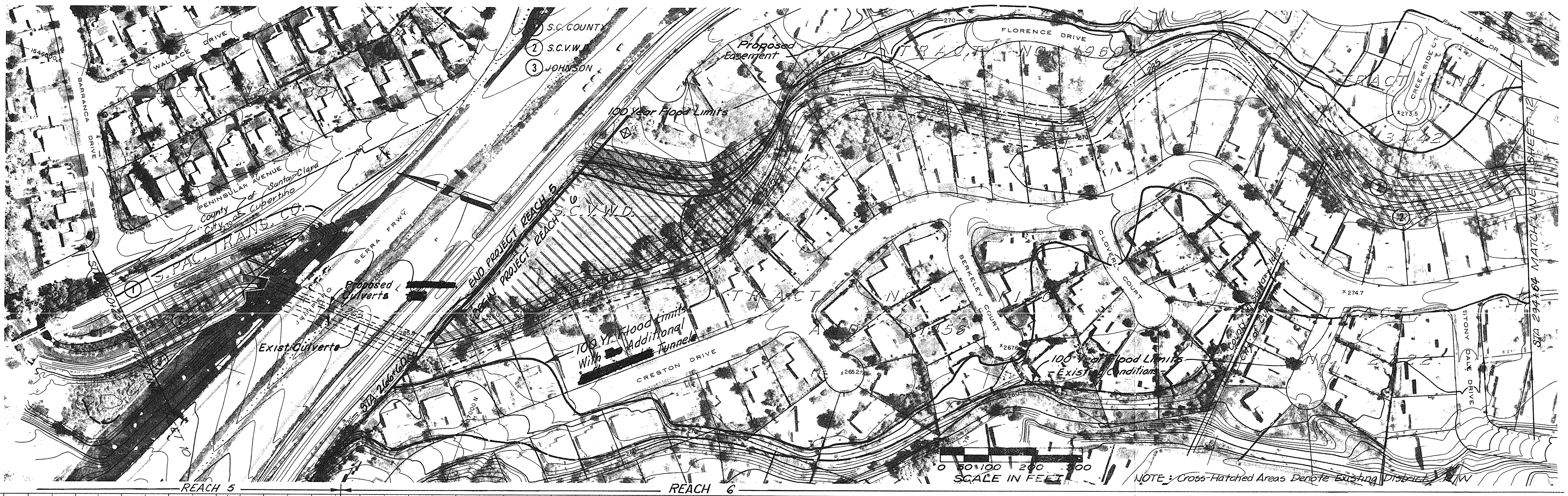
John L. Richardson

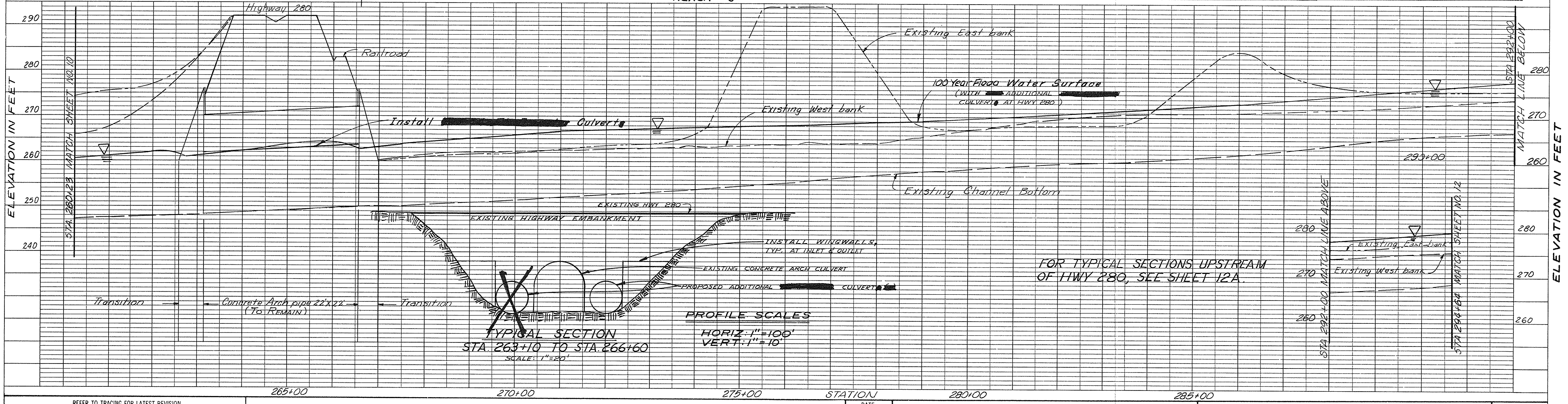
MAP AND GENERAL PLANS

ZONE NW - 1 **PROJECT NO. 10029**

STEVENS CREEK

SCALE As Shown
SHEET 10 OF 17





REACH 5
REACH 6
ELEVATION IN FEET
290
280
270
260
250
240
STA. 260+23 MATCH SHEET NO. 10
Highway 280
Railroad
Install [redacted] Culverts
Existing East bank
Existing West bank
100 Year Flood Water Surface (WITH [redacted] ADDITIONAL CULVERTS AT HWY 280)
Existing Channel Bottom
293+00
STA. 292+00 MATCH LINE BELOW
Transition
Concrete Arch pipe 22'x22' (To Remain)
Transition
EXISTING HWY 280
EXISTING HIGHWAY EMBANKMENT
INSTALL WINGWALLS, TYP. AT INLET & OUTLET
EXISTING CONCRETE ARCH CULVERT
PROPOSED ADDITIONAL [redacted] CULVERTS
TYPICAL SECTION
STA. 263+10 TO STA. 266+60
SCALE: 1"=20'
PROFILE SCALES
HORIZ: 1"=100'
VERT: 1"=10'
FOR TYPICAL SECTIONS UPSTREAM OF HWY 280, SEE SHEET 12A.
STA. 292+00 MATCH LINE ABOVE
Existing East bank
Existing West bank
STA. 294+64 MATCH SHEET NO. 12
265+00
270+00
275+00
STATION
280+00
285+00

REFER TO TRACING FOR LATEST REVISION

REV.	DESCRIPTION	SUB.	APPR.

PHOTO-IMAGE FROM PHOTOGRAPHY DATED 3-24-70
TOPOGRAPHY FROM PHOTOGRAPHY DATED 11-11-69
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SCALE 1 INCH = 100 FEET
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CONTOUR INTERVAL 2 FEET

COMPILED BY WAHLEN AERIAL SURVEYS W6940

DATE 7/3/74
DESIGN S.N.W.
DRAWN L.H.
CHECKED

Santa Clara Valley Water District

ENGINEERING CERTIFICATION
PROJECT ENGINEER
DIVISION ENGINEER R.C.E. NO.

ENGINEERING APPROVAL
John L. Richardson
HEAD, PROJECT DEVELOPMENT BRANCH R.C.E. NO. 17646

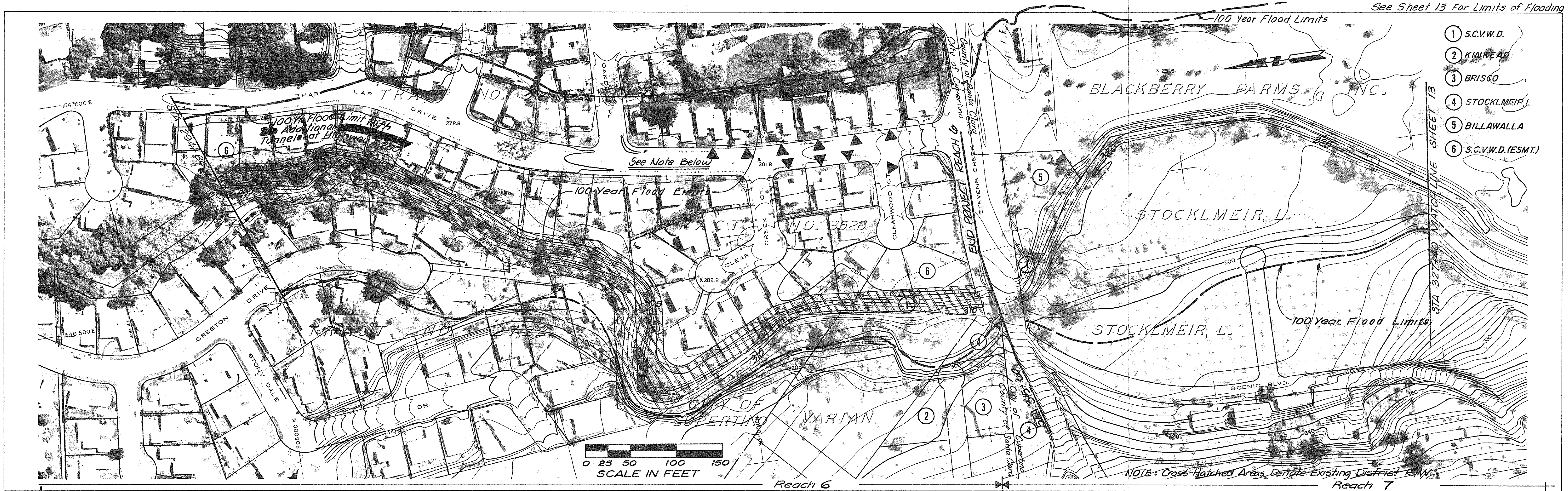
MAP AND GENERAL PLANS

ZONE NW-1
PROJECT NO. 10029

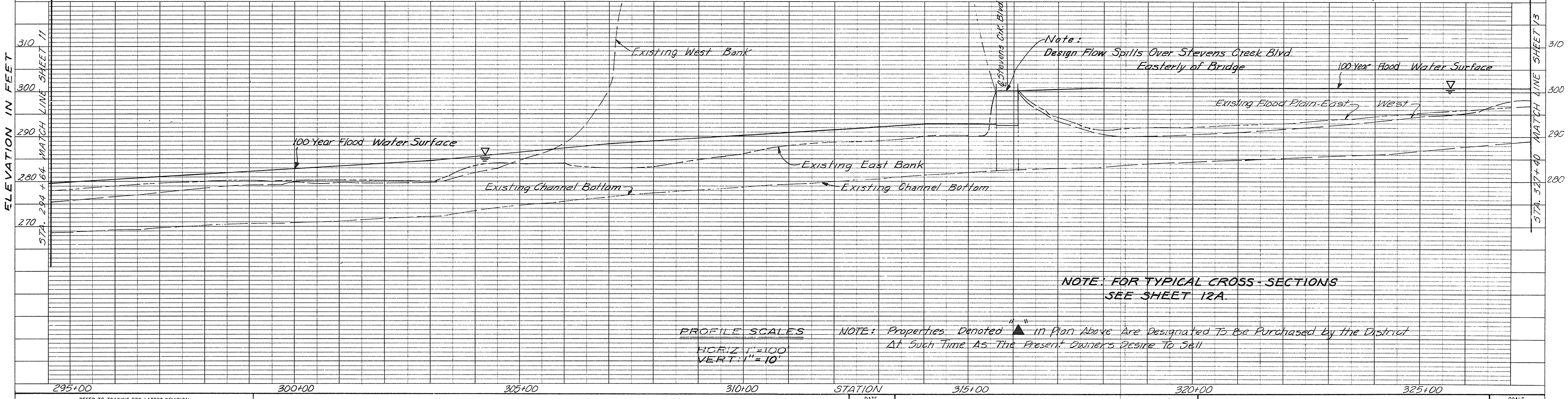
STEVENS CREEK

SCALE As Shown
SHEET 11 OF 17

See Sheet 13 For Limits of Flooding



Reach 6 | Reach 7



NOTE: FOR TYPICAL CROSS-SECTIONS SEE SHEET 12A.

PROFILE SCALES
HORIZ: 1"=100'
VERT: 1"=10'

NOTE: Properties Denoted "▲" in Plan Above Are Designated To Be Purchased by the District At Such Time As The Present Owners Desire To Sell

REFER TO TRACING FOR LATEST REVISION

REV.	DESCRIPTION	SUB.	APPR.

PHOTO-IMAGE FROM PHOTOGRAPHY DATED 3-24-70
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SCALE 1 INCH = 100 FEET
100 0 100 200 300 400
CONTOUR INTERVAL 2 FEET

COMPILED BY WAHLEN AERIAL SURVEYS W6940

DATE	7/3/74
DESIGN	S.N.W.
DRAWN	L.H.
CHECKED	

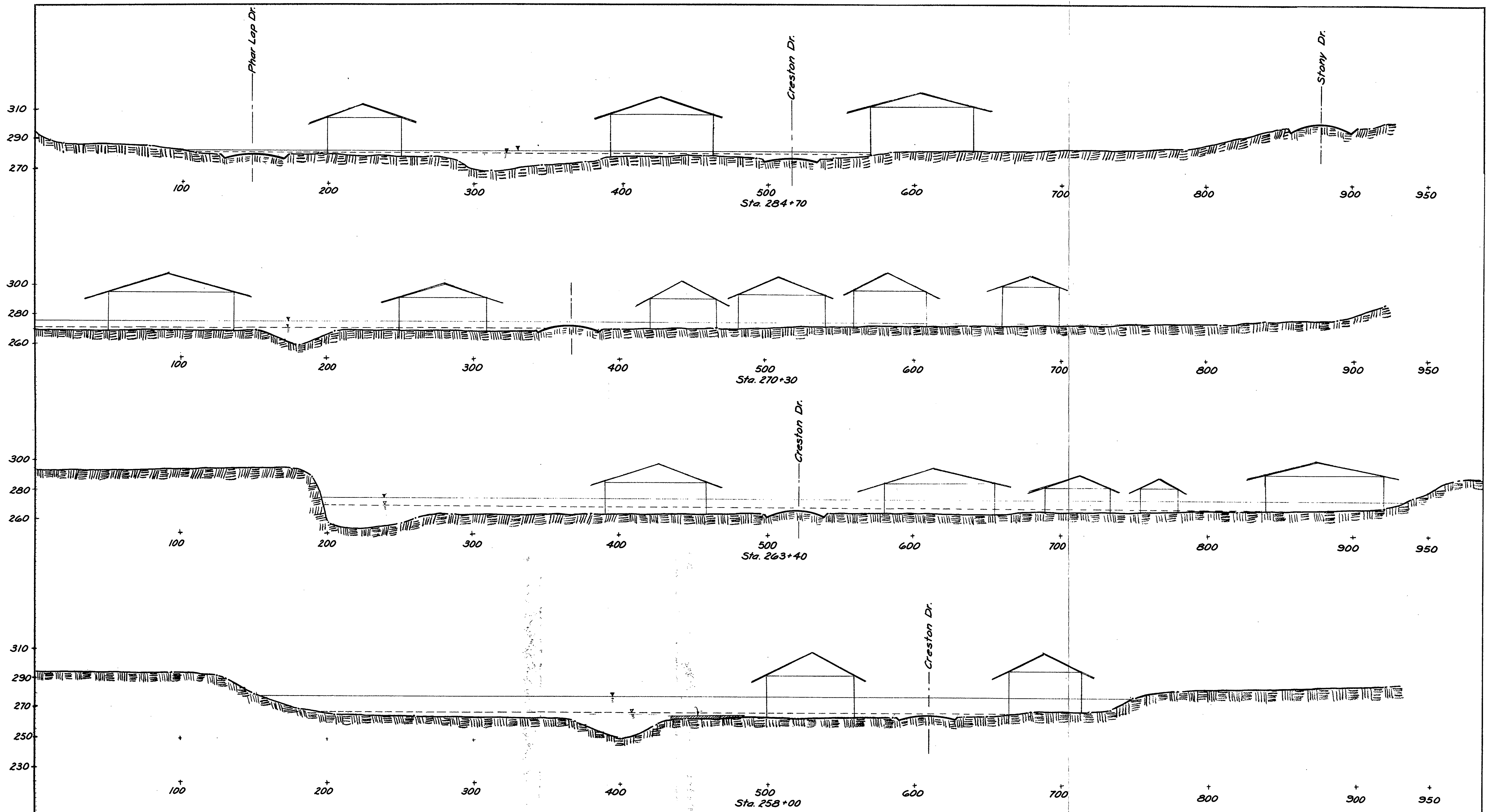
Santa Clara Valley Water District

ENGINEERING CERTIFICATION
Stanley A. Wolf
PROJECT ENGINEER
DIVISION ENGINEER R.C.E. NO.

ENGINEERING APPROVAL
John L. Richardson
HEAD, PROJECT DEVELOPMENT BRANCH R.C.E. NO. 17646

MAP AND GENERAL PLANS
ZONE NW-1 PROJECT NO. 10029
STEVENS CREEK

SCALE
As Shown
SHEET
12
OF 17



Typical Cross-Sections Upstream of Highway 280

REFER TO TRACING FOR LATEST REVISION

REV.	DESCRIPTION	SUB.	APPR.

REFERENCE INFORMATION AND NOTES.

——— Water Surface Profile Elevation For The Existing Conditions.

-----Water Surface Elevation With Two 14-ft. Dia. Tunnels Under Hwy. 280

All Sections Looking Upstream.

DATE 4-13-74
DESIGN J.P.
DRAWN N.L.
CHECKED

Santa Clara Valley Water District

ENGINEERING CERTIFICATION
PROJECT ENGINEER
DIVISION ENGINEER R.C.E. NO. 15851

ENGINEERING APPROVAL
John L. Richardson
HEAD, DESIGN BRANCH R.C.E. NO. 14455

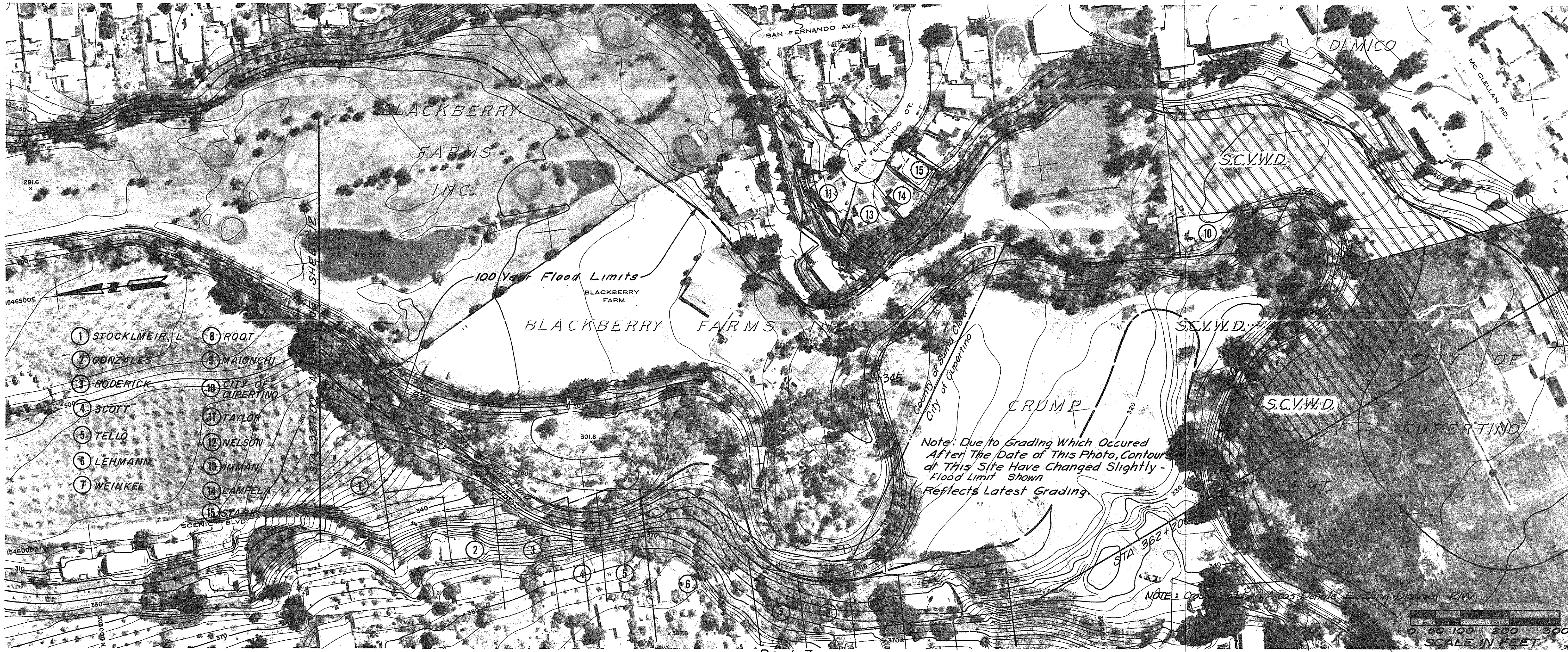
MAP AND GENERAL PLANS

ZONE NW - 1 PROJECT NO. 10029

STEVENS CREEK

SCALE
VERT. 1" = 30'
HORIZ. 1" = 30'

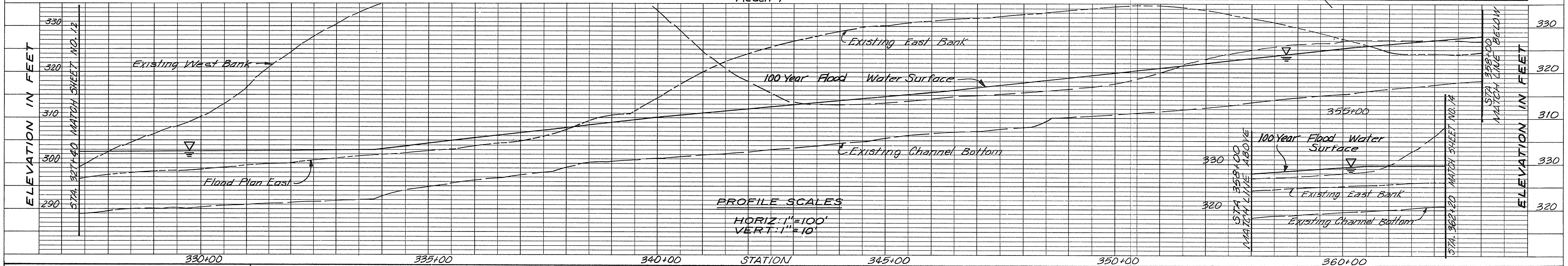
SHEET
12A
OF 17



Note: Due to Grading Which Occured After The Date of This Photo, Contours at This Site Have Changed Slightly - Flood Limit Shown Reflects Latest Grading.

NOTE: Cross Hatched Areas Denote Existing District R/W

Reach 7



PROFILE SCALES

HORIZ: 1" = 100'
VERT: 1" = 10'

REFER TO TRACING FOR LATEST REVISION

REV.	DESCRIPTION	SUB.	APPR.

PHOTO-IMAGE FROM PHOTOGRAPHY DATED 3-24-70
TOPOGRAPHY FROM PHOTOGRAPHY DATED 11-11-70
BASIS OF ELEVATIONS USC & GS 1927 DATUM ADJUSTED 1966/67
BASIS OF GRID CALIFORNIA COORDINATE SYSTEM, ZONE 3

SCALE 1 INCH = 100 FEET

100 0 100 200 300 400

CONTOUR INTERVAL 2 FEET

COMPILED BY WAHLEN AERIAL SURVEYS W6940

DATE 7/3/74
DESIGN S.N.W.
DRAWN L.H.
CHECKED

Santa Clara Valley Water District

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DIVISION ENGINEER R.C.E. NO.

ENGINEERING APPROVAL
John L. Richardson
HEAD, PROJECT DEVELOPMENT BRANCH R.C.E. NO. 17646

MAP AND GENERAL PLANS

ZONE NW - 1 **PROJECT NO. 10029**

STEVENS CREEK

SCALE As Shown
SHEET 13 OF 17

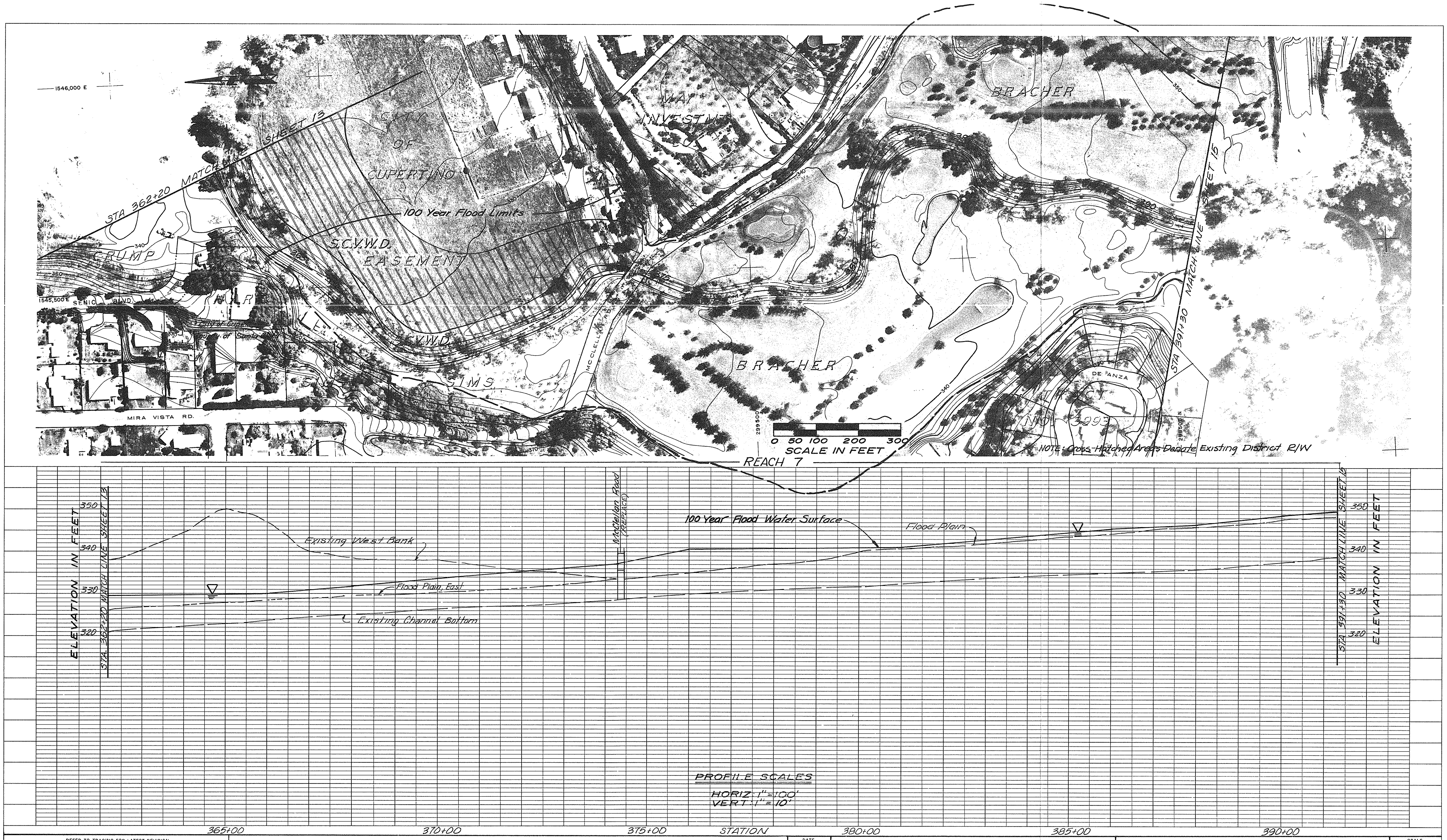

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PHOTO-IMAGE FROM PHOTOGRAPHY DATED 3-24-70
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100 0 100 200 300 400

CONTOUR INTERVAL 2 FEET

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DATE 7/3/74
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Santa Clara Valley Water District

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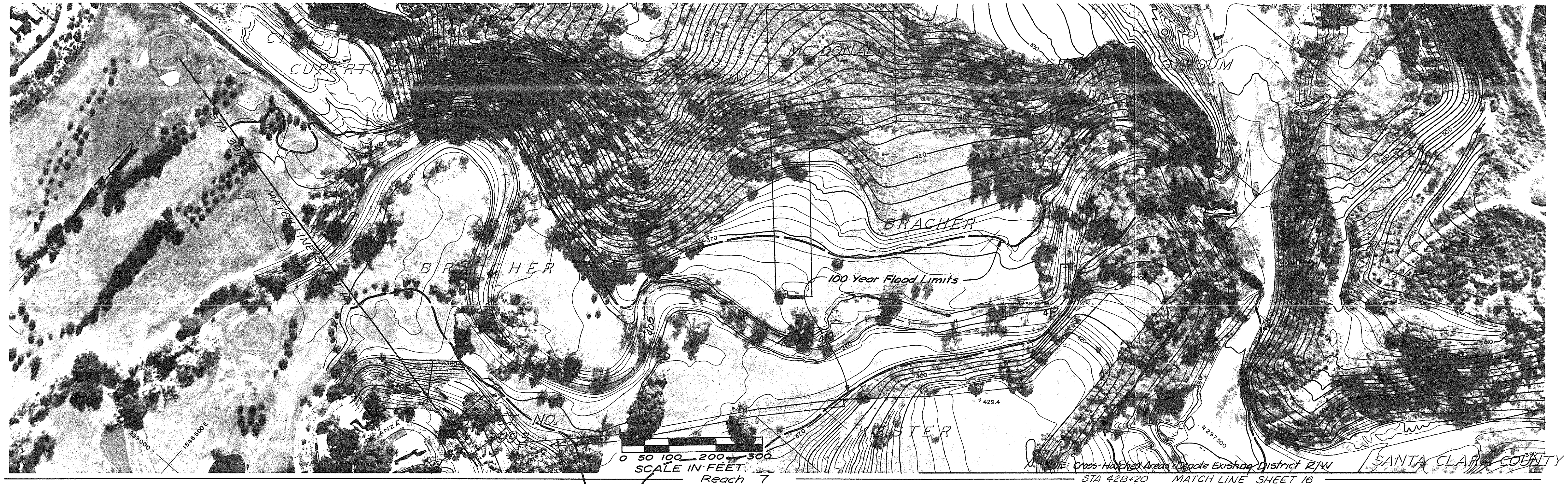
ENGINEERING APPROVAL
John L. Richardson
HEAD, PROJECT DEVELOPMENT BRANCH R.C.E. NO. 17646

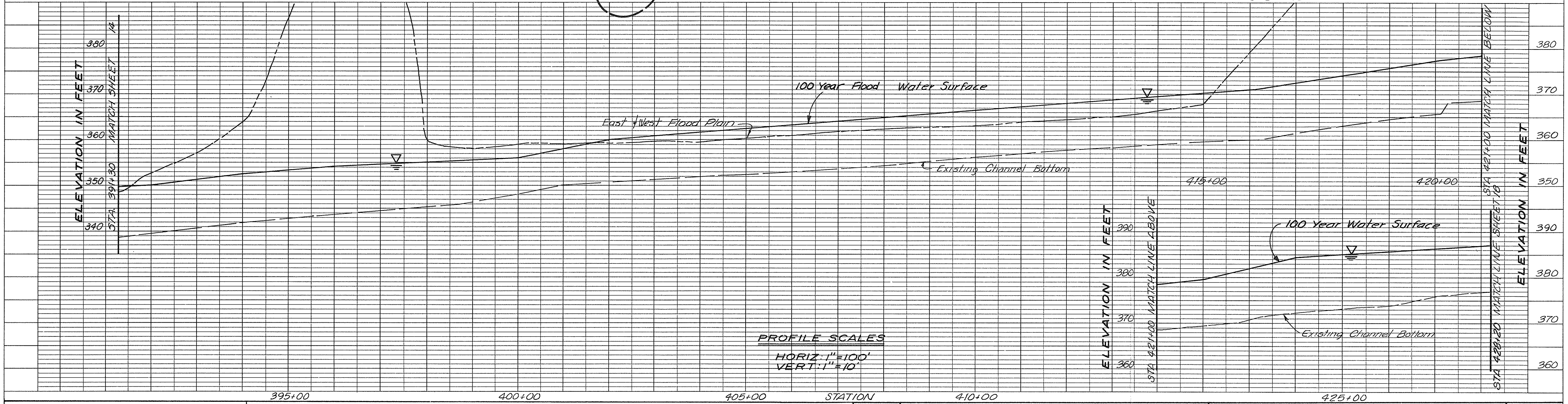
MAP AND GENERAL PLANS

ZONE NW - 1 **PROJECT NO. 10029**

STEVENS CREEK

SCALE As Shown
SHEET 14 OF 17





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100 0 100 200 300 400

CONTOUR INTERVAL 2 FEET

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DATE 7/3/74
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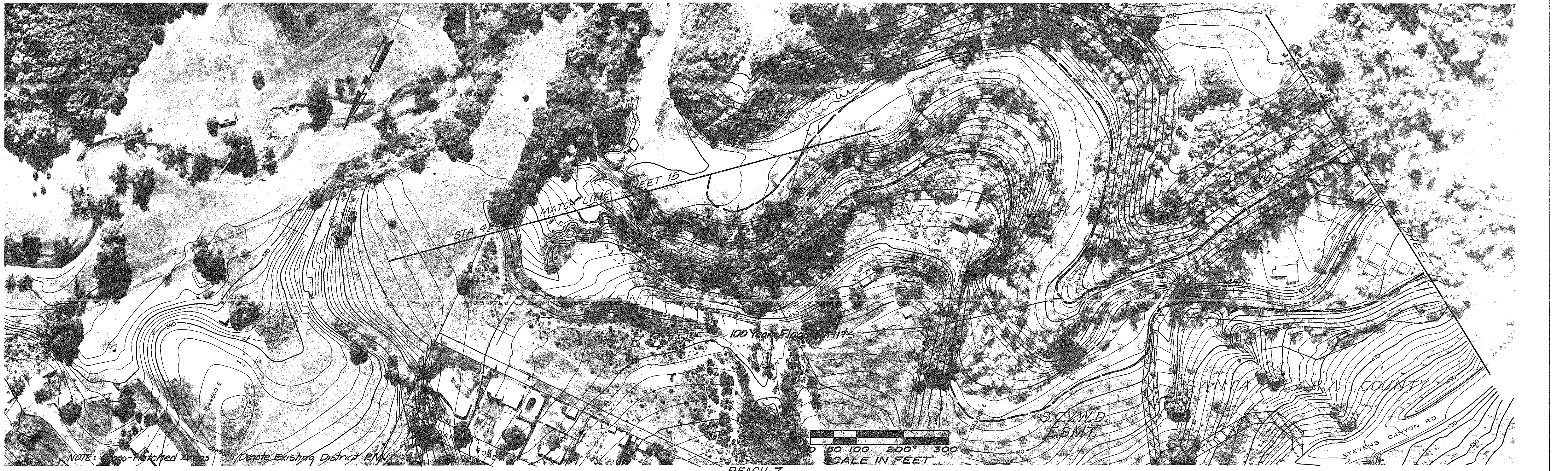
MAP AND GENERAL PLANS

ZONE NW - 1 **PROJECT NO. 10029**

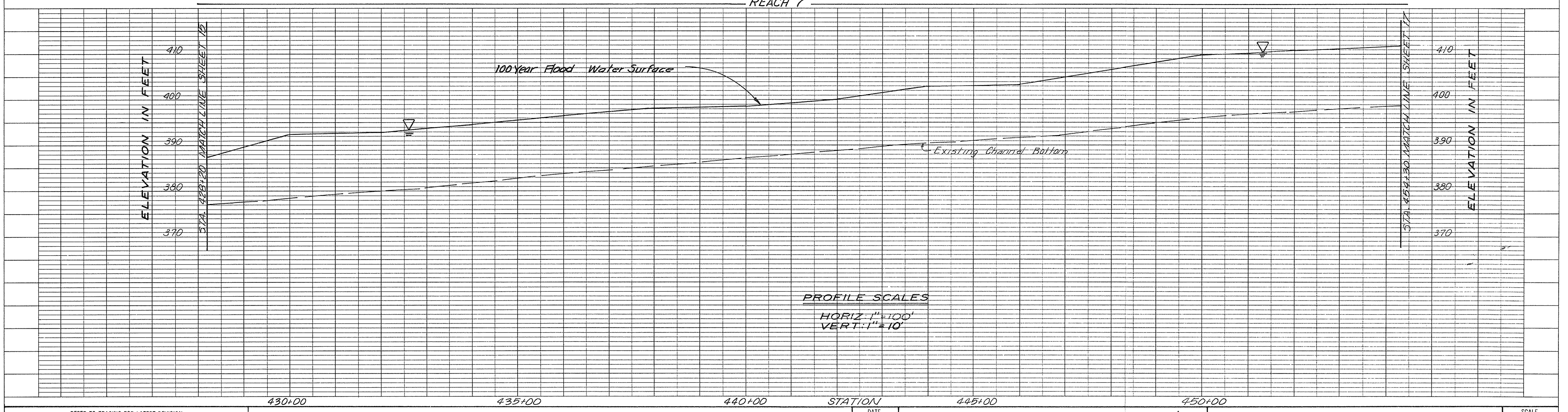
STEVENS CREEK

SCALE As Shown

SHEET 15 OF 17



NOTE: Cross-Hatched Areas Denote Existing District R/W



PROFILE SCALES
HORIZ: 1"=100'
VERT: 1"=10'

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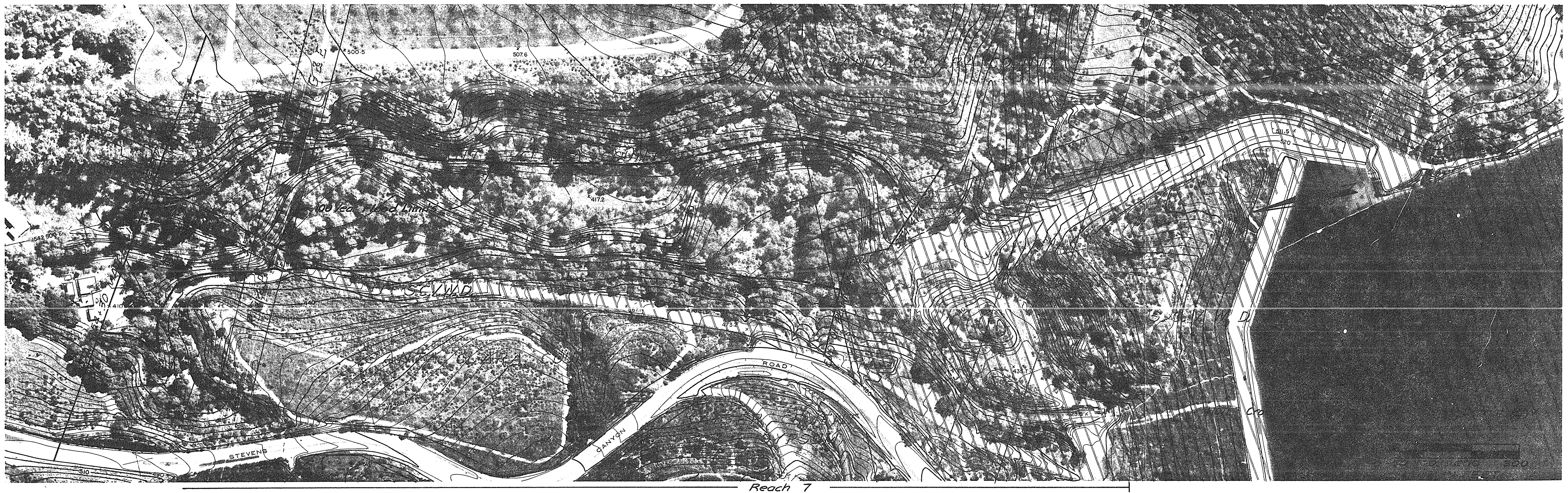
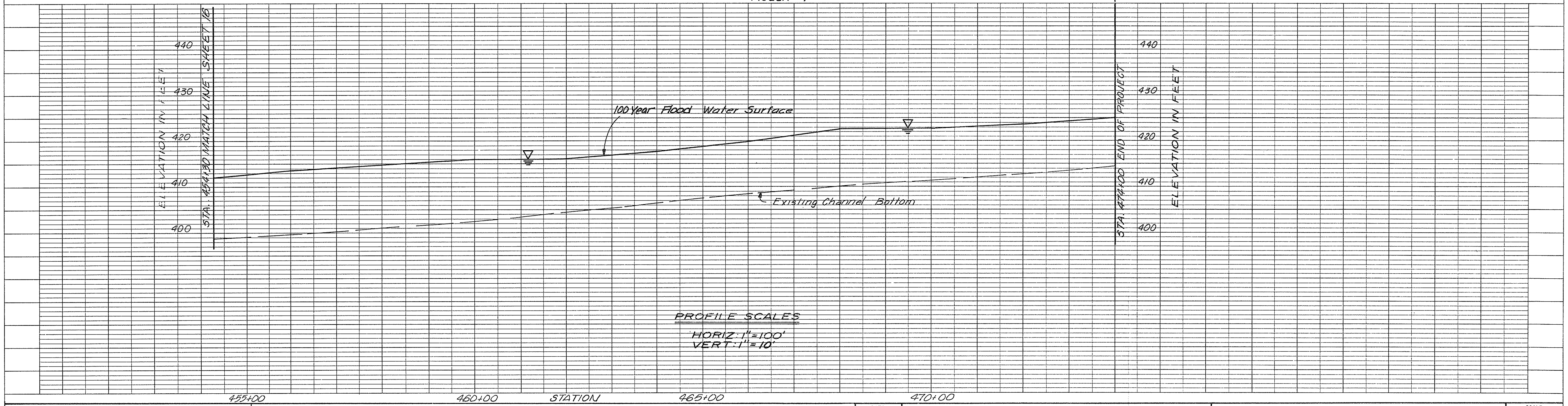
MAP AND GENERAL PLANS

ZONE NW - 1 PROJECT NO. 10029

STEVENS CREEK

SCALE As Shown
SHEET 16 OF 17





PROFILE SCALES

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MAP AND GENERAL PLANS

ZONE NW - 1 **PROJECT NO. 10029**

STEVENS CREEK

SCALE As Shown
SHEET 17 OF 17